WIPP PA

User's Manual

for

FMT (Version 2.40)

Addendum to Document Version 2.3

WPO# 43037

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1.0 INTRODUCTION

FMT is a FORTRAN computer code used to calculate chemical equilibrium in high-ionic-strength geochemical systems at 25 °C. FMT Version 2.4 has incorporated the following additional functionality:

- *Fix solution pH or CO_2 fugacity (f_{CO2}) as specified in an input file.*
- *Disable any chemical species as specified in an input file.*

The thermodynamic database that supports FMT calculations has also been updated. This addendum provides additional information about the use of FMT Version 2.4. For a complete use instruction, a user should also refer to FMT User's Manual Version 2.3.

1.1 Software Identifier

FMT, Version 2.4 Code Prefix: FMT

1.2 Point of Contact

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2.0 Requirements

Functional Requirements

R.1 FMT predicts mineral solubilities in the Na-K-Mg-Ca-H-Cl-SO_4-OH-HCO_3-CO_3-CO_2-$B(OH)_3$-H_2O to high ionic strength at 25 °C.

R.2 FMT predicts solubility behavior of Am(III), Th(IV) and Np(V) in brines such as those found in Castile, Rustler, and Salado Formations near the Waste Isolation Pilot Plant (WIPP).

R.3 The "batch" simulation mode calculates chemical equilibrium for a given set of element abundance.

R.4 FMT supports three titration calculation modes: user-specified increments, linear increments, and logarithmic increments.

R.5 FMT fixes solution pH or f_{CO2} as specified in an input file.

R.6 FMT disables any chemical species as specified in an input file.

3.0 Executing FMT Version 2.4

The execution of FMT Version 2.4 is the same as that of Version 2.3, except that the executable code and databases need to be replaced by:

FMT_QB0204.EXE
FMT_PH_970407.CHEMDAT
FMT_HMW_AM3PU3TH4NP5_960823.RHOMIN

These files can be fetched from the SCMS.

4.0 Description of Input Files

A minor modification has been made to input files FMT_*.IN in order to accommodate functional requirements R.5 and R.6. The following two examples provide sufficient information about the modified input file format.

Example 1

In this example, FMT is used to calculate the species concentrations in the WIPP SPC brine. The SPC brine has been used to represent the WIPP Salado brine in various experiments measuring colloidal and dissolved actinide concentrations. In the example, no pH or CO_2 fugacity are specified, and no chemical species are disabled. The corresponding input file FMT_SPC_BM.IN is listed below:

```
'Benchmark BATCH Problem:  SPC Brine, Appx.B SAND91-2111'
'CHEMFILE'
'BATCH' 'UNUSED'
'DISABLE_SPECIES' 0
'nSET_FCO2' 0.0
'nSET_PH' 0.0

'nMOLES' 'nEXACT'
  1.11084063E+02   Hydrogen
  5.57650233E+01   Oxygen
  2.00000000E+00   Sodium
  8.40000000E-01   Potassium
  1.55999951E+00   Magnesium
  1.64000000E-02   Calcium
  5.83000000E+00   Chlorine
  4.36000000E-02   Sulfur
  5.07101504E-03   Carbon
  0.00000000E+00   PosIon:EL
  5.32000000E-02   NegIon:EL
  0.00000000E+00   Oxalate:EL
  2.18000000E-02   Boron
  1.09000000E-02   Bromine
```

```
 0.00000000E+00   Acetate:EL
 0.00000000E+00   Th(IV)
 0.00000000E+00   Am(III)
 0.00000000E+00   U(VI)
 0.00000000E+00   Np(V)
 0.00000000E+00   ClO4:EL
 0.00000000E+00   Phosphorus
 0.00000000E+00   U(IV)
 0.00000000E+00   Lactate:EL
 0.00000000E+00   EDTA:EL
 0.00000000E+00   Citrate:EL
 0.00000000E+00   Electron:E
 2.71310752E-15  Charge:EL
```

Example 2

In this example, FMT is used to calculate the speciation of a Na-K-Cl-CO_2 solution with a fixed pH of 8.3 and f_{CO2} of 10^{-4} atm. Species NaCl (halite) and CO_2 (aq), represented by numbers 171 and 14, are disabled in the calculation. The corresponding input file FMT_FCO2_PH_FIXED.IN is listed below:

```
'SETTING CO2 fugacity and pH'
 'CHEMFILE'
 'BATCH' 'EXPLICIT'
 'DISABLE_SPECIES' 2
 171  14
 'SET_FCO2' 0.99999e-4 1.00001d-4
 'SET_pH' 8.3

'nMOLES' 'nEXACT'
 111.   Hydrogen
 79.5   Oxygen
 7.0    Sodium
 4.5    Potassium
 0      Magnesium
 0      Calcium
 11.5   Chlorine
 0      Sulfur
 12.0   Carbon
 0.0    PosIon:EL
 0.0    NegIon:EL
 0.0    Oxalate:EL
 0      Boron
 0      Bromine
 0.0    Acetate:EL
 0      Th(IV)
 0      Am(III)
 0.0    U(VI)
 0      Np(V)
 0.0    ClO4:EL
 0.0    Phosphorus
 0.0    U(IV)
```

```
0.0     Lactate:EL
0.0     EDTA:EL
0.0     Citrate:EL
0.0     Electron:E
0.0     Charge:EL
```

5.0 Appendix: List of Thermodynamic Database FMT_PH_970407.CHEMDAT

```
'FMT_pH_970407.chemdat'
'Added Th(CO3)5-Cl(-Na) Parms, assigned X+-Th(CO3)5=== by analogy'

27 214 'nNEW T' 'nACTCOEF' 'nECHO' 'nABCD'
200 1.d-6 1.d-16
'NONE' 296.15 1.d0 1.d0

'Hydrogen' 'Oxygen' 'Sodium' 'Potassium' 'Magnesium' 'Calcium' 'Chlorine' 'Sulfur' 'Carbon' 'PosIon:EL'
   'NegIon:EL' 'Oxalate:EL' 'Boron' 'Bromine' 'Acetate:EL' 'Th(IV)' 'Am(III)' 'Pu(III)' 'Np(V)'
   'ClO4:EL' 'Phosphorus' 'U(IV)' 'Lactate:EL' 'EDTA:EL' 'Citrate:EL' 'Electron:EL' 'Charge:EL'
1.0079 15.9994 22.98977 39.0983 24.305 40.08 35.453 32.06 12.011 0.0 0.0 28.84 10.81 79,904 59.044
   232.0381 243.0 238.029 237.0482 99.4306 30.974 242.0 99.07 888.888 189.1 0.0 0.0

'H2O                        WATER'  2  1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  1 -95.6635     HMW84
'Na+                          Na+'  0  0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  1  1 -105.651    HMW84
'K+                           K+'  0  0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  1  1 -113.957    HMW84
'Ca++                        Ca++'  0  0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  2  1 -223.30     HMW84
'Mg++                        Mg++'  0  0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  2  1 -183.468    HMW84
'MgOH+                      MgOH+'  1  1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  1  1 -251.94     HMW84
'H+                           H+'  1  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  1  1  0.         HMW84

'Cl-                          Cl-'  0  0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 -1  1 -52.956     HMW84
'SO4=                        SO4=-'  0  4 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 -2  1 -300.386    HMW84
'HSO4-                      HSO4-'  1  4 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 -1  1 -304.542    HMW84
'OH-                          OH-'  1  1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 -1  1 -63.435     HMW84
'HCO3-                      HCO3-'  1  3 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 -1  1 -236.751    HMW84
'CO3-                       CO3=-'  0  3 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 -2  1 -238.944    HMW84

'CO2(aq)                  CO2(aq)'  0  2 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  1 -155.68     HMW84
'CaCO3(aq)              CaCO3(aq)'  0  3 0 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  1 -443.5      HMW84
'MgCO3(aq)              MgCO3(aq)'  0  3 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  1 -403.155    HMW84

'B(OH)3(aq)            B(OH)3(aq)'  3  3 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  1 -390.61     FW86
'B(OH)4-                B(OH)4-'  4  4 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 -1  1 -465.20     FW86
'B3O3(OH)4-          B3O3(OH)4-'  4  7 0 0 0 0 0 0 0 0 0 0 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 -1  1 -963.77     FW86
'B4O5(OH)4=          B4O5(OH)4=-'  4  9 0 0 0 0 0 0 0 0 0 0 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 -2  1 -1239.10    FW86
'CaB(OH)4+          CaB(OH)4+'  4  4 0 0 0 1 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  1  1 -692.30     FW86
'MgB(OH)4-          MgB(OH)4+'  4  4 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  1  1 -681.89     FW86
'Br-                          Br-'  0  0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 -1  1 -999.99     arbitrary
'ClO4-                  perchlorate'  0  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 -1  1 -73.81     GEM850705

'NaOH(aq)       to.titrate.base.only'  1  1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  1  500.      arbitrary
'HCl(aq)        to.titrate.acid.only'  1  0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  1  500.      arbitrary
'HClO4(aq)      to.titrate.acid.only'  1  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0  0  1  500.      arbitrary
'PosIon                 POSITIVE.ION'  0  0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  1  1  0.        arbitrary
'NegIon                 NEGATIVE.ION'  0  0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 -1  1  0.        arbitrary
'PosIon(OH)(aq)  to.titrate.base'  1  1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  1  500.      arbitrary
'HNegIon(aq)     to.titrate.acid'  1  0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  1  500.      arbitrary

'H3PO4(aq)              H3PO4(aq)'  3  4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0  0  1 -460.90     REF92
'H2PO4-                  H2PO4=-'  2  4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 -1  1 -455.96     REF92
'HPO4=                    HPO4=-'  1  4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 -2  1 -439.367    GEN95a
'PO4---                   PO4---'  0  4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 -3  1 -410.847    REF94

'Am+++                      Am+++'  6  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0  3  1 -241.694    ERF90
'AmCO3+                  AmCO3+'  6  3 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0  1  1 -472.060    ERF90
'Am(CO3)2-            Am(CO3)2-'  6  6 0 0 0 0 0 0 2 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 -1  1 -695.880    ERF90
'Am(CO3)3=-           Am(CO3)3=-'  6  9 0 0 0 0 0 0 3 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 -3  1 -915.460    ERF90
'AmOH++          (after_Cm(III))'  1  1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0  2  1 -315.352
'Am(OH)2+        (after_Cm(III))'  2  2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0  1  1 -392.281
'Am(OH)3(aq)     (1e-9m_minimum)'  3  3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0  0  1 -471.803

'Pu+++                      Pu+++'  9  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0  3  1 -233.4      ERGR89
'PuCO3+                  PuCO3+'  9  3 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0  1  1 -463.766    analogy w/Am(III)
'Pu(CO3)2-            Pu(CO3)2-'  9  6 0 0 0 0 0 0 2 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 -1  1 -687.586    analogy w/Am(III)
'Pu(CO3)3=-           Pu(CO3)3=-'  9  9 0 0 0 0 0 0 3 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 -3  1 -907.166    analogy w/Am(III)
'PuOH++          (after_Cm(III))'  1  1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0  2  1 -307.058    analogy w/Am(III)
'Pu(OH)2+        (after_Cm(III))'  2  2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0  1  1 -383.587    analogy w/Am(III)
'Pu(OH)3(aq)     (1e-9m_minimum)'  3  3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0  0  1 -463.309    analogy w/Am(III)

'Th++++                    Th++++'  0  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0  4  1 -284.227    FRM91
'Th(CO3)5===          Th(CO3)5===-'  0 15 0 0 0 0 0 0 5 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 -6  1 -1411.378  FRSMHC96
'Th(OH)3(CO3)-      Th(OH)3(CO3)-'  3  6 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 -1  1 -775.627   FRSMHC96
'Th(OH)4(aq)            Th(OH)4(aq)'  4  4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0  0  1 -622.840   GEN960119
'Th(SO4)2(aq)          Th(SO4)2(aq)'  0  8 0 0 0 0 0 0 2 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0  0  1 -911.69    FR92
'Th(SO4)3=              Th(SO4)3=-'  0 12 0 0 0 0 0 0 3 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 -2  1 -1214.0    FR92

'U++++                      U++++'  0  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0  4  1 -214.19    RFSM92M
'UOH+++                    UOH+++'  1  1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0  3  1 -308.7     RFSMMN
'U(CO3)5===           U(CO3)5===-'  0 15 0 0 0 0 0 0 5 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 -6  1 -1345.393  Ra196
'U(OH)2(CO3)2=        U(OH)2(CO3)2=-'  2  8 0 0 0 0 0 0 2 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 -2  1 -869.383   Ra196
'U(OH)4(CO3)2==      U(OH)4(CO3)2==-'  4 10 0 0 0 0 0 0 2 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 -4  1 -998.662   Ra196
'U(OH)4(aq)              U(OH)4(aq)'  4  4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0  0  1  999.999
'U(SO4)2(aq)            U(SO4)2(aq)'  0  8 0 0 0 0 0 0 2 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0  0  1  999.998
'U(SO4)3=               U(SO4)3=-'  0 12 0 0 0 0 0 0 3 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 -2  1  999.998

'NpO2+                      NpO2+'  0  2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0  1  1 -369.109    FNK95
'NpO2CO3-                NpO2CO3-'  0  5 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 -1  1 -593.635    FNK95
'NpO2(CO3)2=-        NpO2(CO3)2=-'  0  8 0 0 0 0 0 0 2 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 -3  1 -809.895    FNK95
'NpO2(CO3)3===      NpO2(CO3)3===-'  0 11 0 0 0 0 0 0 3 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 -5  1 -1020.306  FNK95
'NpO2OH(aq)              NpO2OH(aq)'  1  3 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0  0  1 -438.738    FNK95
'NpO2(OH)2-              NpO2(OH)2-'  2  4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 -1  1 -506.249    FNK95

'HAc(aq)                  AceticAcid'  1  0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0  0  1 -158.3      NBC96
'Ac-                        Acetate-'  0  0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 -1  1 -147.347    NBC96

'H3Citrate(aq)          CitricAcid'  3  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0  0  1  000.000    RCM96
'H2Citrate-              H2Citrate-'  2  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 -1  1    7.245    RCM96
'HCitrate=               HCitrate=-'  1  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 -2  1   18.3      RCM96
'Citrate=-               Citrate=-'  0  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 -3  1   33.068    RCM96

'H4EDTA(aq)              H4EDTA(aq)'  4  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0  0  1  000.000    RCM96
'H3EDTA-                  H3EDTA-'  3  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 -1  1    8.360    RCM96
'H2EDTA=                  H2EDTA='  2  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 -2  1   11.659    RCM96
'HEDTA==                  HEDTA=-'  1  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 -3  1   26.700    RCM96
'EDTA==                    EDTA--'  0  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 -4  1   52.109    RCM96

'H2Ox(aq)                OxalicAcid'  2  0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  1   0.000    RCM96
'HOx-                     Bioxalate-'  1  0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 -1  1   3.052    RCM96
'Ox=                        Oxalate='  0  0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 -2  1  12.790    RCM96

'HLactate(aq)            LacticAcid'  1  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0  0  1  000.000    RCM96
'Lactate-                  Lactate-'  0  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 -1  1    9.002    RCM96

'AmAc++                  AmAcetate++'  0  0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0  2  1 -395.358    RCM96
'AmCit(aq)            AmCitrate(aq)'  0  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0  0  1 -228.687    RCM96
'AmEDTA-                  AmEDTA-'  0  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 -1  1 -232.977    RCM96
'AmOx+                  AmOxalate+'  0  0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0  1  1 -243.483    RCM96
'AmLac++              AmLactate++'  0  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0  2  1 -242.338    RCM96

'PuAc++                  PuAcetate++'  0  0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0  2  1 -367.064    analogy w/Am(III)
'PuCit(aq)            PuCitrate(aq)'  0  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0  0  1 -220.393    analogy w/Am(III)
'PuEDTA-                  PuEDTA-'  0  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 -1  1 -224.683    analogy w/Am(III)
'PuOx+                  PuOxalate+'  0  0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0  1  1 -235.189    analogy w/Am(III)
'PuLac++              PuLactate++'  0  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0  2  1 -234.045    analogy w/Am(III)

'ThAc+++                  ThAc+++'  0  0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0  3  1 -448.635    RCM96
'ThCit+                    ThCit+'  0  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 1 0 0 0  1  1 -285.706    RCM96
'ThEDTA(aq)            ThEDTA(aq)'  0  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 1 0 0 0  0  1 -285.817    RCM96
'ThOx++                  Th(U2O4)++'  0  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 2 0 1 0 0 0 0 0 0 0 0  2  1 -297.076    RCM96
'ThLac+++                ThLac+++'  0  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0  3  1 -291.192    RCM96

'UAc+++                    U(IV)Ac+++'  0  0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 1 0 0 0 0 0 0  3  1 -378.602  analogy w/Th++++
'UCit+                     U(IV)Cit+'  0  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 1 0 0 0  1  1 -215.669  analogy w/Th++++
```

```
'UEDTA(aq)'          U(IV)EDTA(aq)'  0  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 0 0  0   1 -215.780     analogy w/Th++++
'ULac++'             U(IV)Lac++'     0  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0  0   1 -221.145     analogy w/Th++++
'UOx++'              U(IV)Ox++'      0  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0  2   1 -227.039     analogy w/Th++++

'NpO2Ac(aq)          NpO2Ac(aq)'     0  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0   1 -619.809     NBC96
'NpO2Cit-'           NpO2Citrate-'   0  2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0  -2  1 -343.086     RCM96
'NpO2EDTA--'         NpO2EDTA--'     0  2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0  -3  1 -337.03      RCM96b
'NpO2Ox-'            NpO2Oxalate-'   0  2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0  -1  1 -366.452     RCM96
'NpO2Lac(aq)         NpO2Lactate(aq)' 0  2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 1  0   1 -364.266     RCM96

'MgAc+               MgAc+'          0  0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0  1   1 -333.346     RCM96c
'MgCit-              MgCit-'         0  0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0  -1  1 -161.979     RCM96c
'MgEDTA=             MgEDTA='        0  0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0  -2  1 -160.325     RCM96c
'MgOx(aq)            MgOx(aq)'       0  0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0  0   1 -178.88      RCM96c
'MgLac+              MgLac+'         0  0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0  1   1  999.999

'CaAc+               (Mg-analog)'    0  0 0 0 0 1 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0  1   1 -373.178     analogy w/Mg++
'CaCit-              (Mg-analog)'    0  0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0  -1  1 -201.811     analogy w/Mg++
'CaEDTA=             (Mg-analog)'    0  0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0  -2  1 -200.157     analogy w/Mg++
'CaOx(aq)            (Mg-analog)'    0  0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0  0   1 -218.712     analogy w/Mg++
'CaLac-              (Mg-analog)'    0  0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0  1   1  999.999

'UnuCat+1-                  UC$1+'   0  0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  1   1  999.999
'UnuAn$1-                   UA$1-'   0  0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  -1  1  999.999
'UnuAn$2-                   UA$2-'   0  0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  -1  1  999.999
'UnuAn$3-                   UA$3-'   0  0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  -1  1  999.999
'UnuAn$4-                   UA$4-'   0  0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  -1  1  999.999
'UnuNeu$1(aq)               UN$1(aq)' 0  0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0   1  999.999

'AmOHCO3(c)_____AmOHCO3(c)'  1  4 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0  0   2  -589.980    FRF90
'Am(OH)3(s)_____Am(OH)3(s)'  3  3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0  0   2  -492.294
'NaAm(CO3)2.6H2O(c)_____'   12 12 1 0 0 0 0 0 2 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0  0   2 -1396.468    RRFEN96
'AmPO4(c)_____AmPO4(c)'      0  4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0  0   2  -709.760    RFF92

'PuOHCO3(c)_____PuOHCO3(c)'  1  4 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0  0   2  -561.686    analogy w/Am(III)
'Pu(OH)3(s)_____Pu(OH)3(s)'  3  3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0  0   2  -484.000    analogy w/Am(III)
'NaPu(CO3)2.6H2O(c)_____'   12 12 1 0 0 0 0 0 2 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0  0   2 -1388.174    analogy w/Am(III)
'PuPO4(c)_____PuPO4(c)'      0  4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0  0   2  -701.456    analogy w/Am(III)

'ThO2(am)____Hydrous_Thorium_Oxide'  0  2 0  0 0 0 0  0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0  0  2 -451.409    FRH91
'Th(SO4)2.9H2O(s)_____'             16 17 0  0 0 0 0  2 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0  0  2 -1775.90    FR92
'Th(SO4)2.8H2O(s)_____'             16 16 0  0 0 0 0  2 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0  0  2 -1680.00    FR92
'Th(SO4)2.Na2SO4.5H2O(16C,s)_____'  12 16 2  0 0 0 0  3 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0  0  2 -2011.29    FR92
'Th(SO4)2.K2SO4.4H2O(16C,s)_____'    8 16 0  2 0 0 0  3 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0  0  2 -1837.57    FR92
'Th(SO4)2.2K2SO4.2H2O(16C,s)_____'   4 18 0  4 0 0 0  4 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0  0  2 -2181.81    FR92
'2[Th(SO4)2.7/2K2SO4(16C,s)]_____'   0 44 0 14 0 0 0 11 0 0 0 0 0 0 0 0 2 0 0 0 0 0 0 0 0 0  0  2 -5381.68 =2[-2790.83]    FR92

'UO2(am)_____Hydrous_U(IV)_Oxide'  0  2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0  0  2 -399.67     RESMNN

'Np2O2H(aged)_____Np2O2H(aged)'  1  3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0  0  2  -454.373    ENK95
'Np2O2H(amor)_____Np2O2H(amor)'  1  3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0  0  2  -452.761    ENK95
'2[NaNp2CO3.7/2H2O(s)]_____'    14 17 2 0 0 0 0 0 2 0 0 0 0 0 0 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0  0  2 -2056.124   =2*[-1048.062]  ENK95
'Na3Np2(CO3)2[s]__Na3Np2(CO3)2[s]'  9  8 3 0 0 0 0 0 2 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0  0  2 -1144.601   ENK95
'KNp2CO3(s)_____KNp2CO3(s)'      9  5 0 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0  0  2  -727.33     Np(V)MSI96
'K3Np2(CO3)2(s)___K3Np2(CO3)2(s)'  9  8 0 3 0 0 0 0 2 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0  0  2 -1173.56    Np(V)MSI96

'H2Ox.2H2O(s)_____H2C2O4.2H2O(s)'  6  2 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -151.370   CFN16APR96
'NaHOx.H2O(s)_____NaHC2O4.H2O(s)'  5  1 1 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -202.245   CFN16APR96
'Na2Ox(s)_____Na2C2O4(s)'          0  0 2 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -203.651   CFN16APR96
'CO2("acid",DISABLED)_____'        0  2 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2   399.999   (-188.092 HMW)

'CaSO4_____Anhydrite'  0  4 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -533.73     HMW84
'NaK3(SO4)2__Aphthitalite/Glaserite'  0  8 1 3 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -1057.05    HMW84
'CaCl2.6H2O_____Antarcticite'  12  6 0 0 0 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -893.85    HMW84
'CaCO3_____Aragonite'  0  3 0 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -455.17    HMW84
'K2SO4_____Arcanite'  0  4 0 2 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -532.39    HMW84
'MgCl2.6H2O_____Bischofite'  12  6 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -953.1     HMW84
'Na2Mg(SO4)2.4H2O_____Bloedite'  8 12 2 0 1 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -1383.6     HMW84
'Mg(OH)2_____Brucite'  2  2 0 0 1 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -335.4     HMW84
'Na6CO3(SO4)2_____Burkeite'  0 11 6 0 0 0 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -1449.4     HMW84
'CaCO3_____Calcite'  0  3 0 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -455.6     HMW84
'CaCl2.4H2O_____CaCl2_Tetrahydrite'  8  4 0 0 0 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -698.7     HMW84
'Ca4Cl2(OH)6.13H2O__CaOxychloride_A'  32 19 0 0 0 4 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -2658.45    HMW84
'Ca2Cl2(OH)2.H2O___CaOxychloride_B'  6  3 0 0 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -778.41    HMW84
'KMgCl3.6H2O_____Carnallite'  12  6 0 1 1 0 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -1020.3     HMW84
'MgSO4.7H2O_____Epsomite'  14 11 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -1157.83    HMW84
'CaNa2(CO3)2.5H2O_____Gaylussite'  10 11 2 0 0 1 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -1360.5     HMW84
'Na2Ca(SO4)2_____Glauberite'  0  8 2 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -1047.45    HMW84
'CaSO4.2H2O_____Gypsum'  4  8 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -725.56    HMW84
'NaCl_____Halite'  0  2 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -154.99    HMW84
'MgSO4.6H2O_____Hexahydrite'  12 10 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -1061.60    HMW84
'KMgClSO4.3H2O_____Kainite'  6  7 0 1 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -938.2     HMW84
'KHCO3_____Kalicinite'  1  3 0 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -350.06    HMW84
'MgSO4.H2O_____Kieserite'  2  5 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -579.80    HMW84
'K2Mg(SO4)2.4H2O_____Leonite'  8 12 0 2 1 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -1403.97    HMW84
'Na4Ca(SO4)3.2H2O_____Labile_Salt'  4 14 4 0 0 1 0 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -1751.45    HMW84
'MgCO3_____Magnesite'  0  3 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -414.45    HMW84
'MgCl(OH)3.4H2O_____MgOxychloride'  11  7 0 0 3 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -1029.6     HMW84
'KHSO4_____Mercallite'  5  4 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -417.57    HMW84
'Na2SO4.10H2O_____Mirabilite'  20 14 2 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -1471.15    HMW84
'KNH6(SO4)7_____Misenite'  8 28 0 8 0 0 0 7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -3035.24    HMW84
'NaHCO3_____Nahcolite'  1  3 1 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -343.39    HMW84
'Na2CO3.10H2O_____Natron'  20 13 2 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -1382.78    HMW84
'MgCO3.3H2O_____Nesquehonite'  8  6 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -695.3     HMW84
'K2Mg(SO4)2.6H2O_Picromerite/Schoen'  12 14 0 2 1 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -1596.1     HMW84
'Na2Ca(CO3)2.2H2O_____Pirssonite'  6  8 2 0 0 1 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -1073.1     HMW84
'K2Mg2Ca2(SO4)4.2H2O____Polyhalite'  4 18 0 2 1 2 0 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -2282.5     HMW84
'Ca(OH)2_____Portlandite'  2  2 0 0 0 1 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -362.12    HMW84
'K2CO3.3/2H2O___Potassium_Carbonate'  3  4.5 0 2 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -577.37    HMW84
'K9H4(CO3)6.3H2O___K-Sequicarbonate'  10 21 0 6 0 0 0 0 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -2565.4     HMW84
'KNaCO3.6H2O_____K-Na-Carbonate'  12  9 1 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -1006.8     HMW84
'K2NaH(CO3)2.2H2O___Potassium_Trona'  5  8 1 2 0 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -671.74    HMW84
'K3H(SO4)2__Sesquipotassium_Sulfate'  1  8 0 3 0 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -950.8     HMW84
'Na3H(SO4)2__Sesquisodium_Sulfate'  1  8 3 0 0 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -819.6     HMW84
'Na2CO3.7H2O___Na2CO3-Heptahydrate'  14 10 2 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -1094.95    HMW84
'KCl_____Sylvite'  0  0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -164.84    HMW84
'K2Ca(SO4)2.H2O_____Syngenite'  2  9 0 2 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -1164.9     HMW84
'Mg2CaCl6.12H2O_____Tachyhydrite'  24 12 0 0 2 1 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -2015.9     HMW84
'Na2SO4_____Thenardite'  0  4 2 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -512.35    HMW84
'Na2CO3.H2O_____Thermonatrite'  2  4 2 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -519.8     HMW84
'Na3H(CO3)2.2H2O_____Trona'  5  8 3 0 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -960.39    HMW84
'Na2B4O7.10H2O_____Borax'  20 17 2 0 0 0 0 0 0 0 0 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -2924.16    EW86
'B(OH)3_____Borix_Acid_Solid'  3  3 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -390.88    EW86
'KB5O8.4H2O____K-Pentaborate_(30_C)'  8 12 0 1 0 0 0 0 0 0 0 5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -1770.26    EW86
'K2B4O7.4H2O___K-Tetraborate_(30_C)'  8 11 0 2 0 0 0 0 0 0 0 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -1663.47    EW86
'NaBO2.4H2O_____Sodium_Metaborate'  8  6 1 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -761.42    EW86
'NaB5O8.5H2O_____Sodium_Pentaborate'  10 13 1 0 0 0 0 0 0 0 0 5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -1854.80    EW86
'NaBO2.NaCl.2H2O___Taspleite_(24_C)'  4  4 2 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2  -725.77    EW86
'CaMg(CO3)2_____Dolomite'  0  6 0 0 1 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -1075.39    HMW84
'Mg5(CO3)4(OH)2.4H2O_HydroMagne5424'  10 18 0 0 5 0 0 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -2364.06    RRM73
'Mg4(CO3)3(OH)2.3H2O_HydroMagne4323'  8 14 0 0 4 0 0 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  0  2 -1858.104   Lang65
'H+(solid)_____to.set.pH+'   1  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  1  2  0.0
'OH-/H2O(solid)_____to.set.pH+' -1  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 -1  2  0.0

'nDG_BYPASS' 0
'PITZACT'
 38 #Cations
 53 #Anions
 26 #Neutrals

  1  .0765     .2644     .0      .00127   Na+ Cl-          HMW84 (beta0, beta1, beta2, cphi) NOTE: HMW gives .2644; P91 gives .2664
  1  .01958   1.113      .0      .00497   Na+ SO4=         HMW84
  1  .0484     .398      .0      .0       Na+ HSO4-        HMW84
  1  .0864     .253      .0      .0044    Na+ OH-          HMW84
  1  .0277     .0411     .0      .0       Na+ HCO3-        HMW84
  1  .0399    1.389      .0      .0044    Na+ CO3=         HMW84
  1 -.0427     .089      .0      .0114    Na+ B(OH)4-      PW86
  1 -.056     -.910      .0      .0       Na+ B3O3(OH)4-   PW86
  1 -.11      -.40       .0      .0       Na+ B4O5(OH)4=   PW86
  1  .2         .0       .0      .0       Na+ Br-
```

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1  .0       .0       .0       .0       Na+ Am(CO3)2-       AMTFN96
1 -.255     5.0      .0       .0443    Na+ Am(CO3)3--      AMTFN96
1  .0554    .2755    .0      -.00118   Na+ ClO4-           E91
1  .0       .0       .0       .0       Na+ NpO2(OH)2       NR94/ENK95
1  .10      .34      .0       .0       Na+ NpO2CO3-        ENK95
1  .48      4.4      .0       .0       Na+ NpO2(CO3)2--    ENK95
1  1.80     22.7     .0       .0       Na+ NpO2(CO3)3---   ENK95
1 -.0533    .0396    .0       .00795   Na+ H2PO4-          E91
1 -.0583    1.466    .0       .0294    Na+ HPO4=           E91
1  .1781    3.851    .0      -.05154   Na+ PO4---          E91
1  .12      .0       .0       .0       Na+ Th(SO4)2-       FR92
1  .0       .0       .0       .0       Na+ Th(OH)3(CO3)-
1  1.31     30.      .0       .0       Na+ Th(CO3)5---     FR95HC96
1 -.0307    .0       .0       .0       Na+ HOx-            RCM96
1  0.0028   1.861    .0       .027     Na+ Ox=             RCM96
1  .1426    .22      .0      -.00629   Na+ Ac-             NBC96
1  .1349   -.7242    .0       .0       Na+ Lac-            RCM96
1 -0.0613   .5548    .0       .0       Na+ H2Cit-          RCM96
1 -.0014    2.339    .0       .0       Na+ HCit=           RCM96
1  .2823    5.411    .0       .0       Na+ Cit---          RCM96
1 -.0908    .0825    .0       .0       Na+ H3EDTA-         RCM96
1 -.1272    2.863    .0       .0       Na+ H2EDTA=         RCM96
1  .2619    8.325    .0       .0       Na+ HEDTA--         RCM96
1  1.034    11.34    .0       .0       Na+ EDTA---         RCM96
1 -.2307    .0       .0       .0       Na+ AmEDTA=         RCM96
1 -.4092    1.221    .0      -.213     Na+ NpO2Cit-        RCM96
1  .5067    7.736    .0       .0       Na+ NpO2EDTA--      RCM96b
1 -.1893    .0       .0       .0       Na+ NpO2Ox-         RCM96
1  .41      17.25    .0       .0       Na+ U(OH)4(CO3)2--  Ra196
1 1.31      30.0     .0       .0       Na+ U(CO3)5---      Ra196
1  .0       .0       .0       .0       Na+ U(SO4)3=
1  .0       .0       .0       .0       Na+ Pu(CO3)2-       analogy w/Am(III)
1 -.256     5.0      .0       .0443    Na+ Pu(CO3)3--      analogy w/Am(III)
1 -.2307    .0       .0       .0       Na+ PuEDTA-         RCM96
1  .2317    .0       .0       .0       Na+ CaCit-          analogy w/Mg++
1  .9289    .0       .0       .0       Na+ CaEDTA=         analogy w/Mg++
1  .0       .0       .0       .0       Na+ UnuAn#2-
1  .0       .0       .0       .0       Na+ UnuAn#3-
1  .0       .0       .0       .0       Na+ UnuAn#4-
1  .0       .0       .0       .0       Na+ U(OH)2(CO3)2=
1  .2317    .0       .0       .0       Na+ MgCit-          RCM96c
1  .9289    .0       .0       .0       Na+ MgEDTA=         RCM96c
1  .0       .0       .0       .0       Na+ UnuAn#1-

1  .04835   .2122    .0      -.00084   K+ Cl-              HMW84
1  .04995   .7795    .0       .0       K+ SO4=             HMW84
1 -.0003    .1735    .0       .0       K+ HSO4-            HMW84
1  .1298    .320     .0       .0041    K+ OH-              HMW84
1  .0296   -.013     .0      -.008     K+ HCO3-            HMW84
1  .1488    1.43     .0      -.0015    K+ CO3=             HMW84
1  .035     .14      .0       .0       K+ B(OH)4-          FW85
1 -.13      .6       .0       .0       K+ B3O3(OH)4-       FW85
1 -.0V2     .9       .0       .0       K+ B4O5(OH)4=       FW85
1  .0       .0       .0       .0       K+ Br-
1  .0       .0       .0       .0       K+ Am(CO3)2-
1  .0       .0       .0       .0       K+ Am(CO3)3--
1  .0       .0       .0       .0       K+ ClO4-
1  .0       .0       .0       .0       K+ NpO2(OH)2-
1  .10      .34      .0       .0       K+ NpO2CO3-         analogy w/Na+
1  .48      4.4      .0       .0       K+ NpO2(CO3)2--     analogy w/Na+
1 2.34      22.7    -96.      -.22      K+ NpO2(CO3)3==-    Np(V)HS1996
1 -.0678    -.1042   .0       .0       K+ H2PO4-           E91
1  .0248    1.274    .0       .0164    K+ HPO4=            E91
1  .3729    3.972    .0      -.08680   K+ PO4--            E91
1  .90      .0       .0       .0       K+ Th(SO4)3=        FR92
1  .0       .0       .0       .0       K+ Th(OH)3(CO3)-
1 1.31      30.      .0       .0       K+ Th(CO3)5---      by analogy with Na+
1  .0       .0       .0       .0       K+ HOx-
1  .0       .0       .0       .0       K+ Ox=
1  .1567    .3251    .0      -.00660   K+ Ac-              E91
1  .0       .0       .0       .0       K+ Lac-
1  .0       .0       .0       .0       K+ H2Cit-
1  .0       .0       .0       .0       K+ HCit=
1  .0       .0       .0       .0       K+ Cit---
1  .0       .0       .0       .0       K+ H3EDTA-
1  .0       .0       .0       .0       K+ H2EDTA-
1  .0       .0       .0       .0       K+ HEDTA--
1  .0       .0       .0       .0       K+ EDTA---
1  .0       .0       .0       .0       K+ AmEDTA=-
1  .0       .0       .0       .0       K+ NpO2Cit=
1  .0       .0       .0       .0       K+ NpO2EDTA---
1  .0       .0       .0       .0       K+ NpO2Ox-
1  .41      17.25    .0       .0       K+ U(OH)4(CO3)2-- Ra196
1 1.31      30.0     .0       .0       K+ U(CO3)5---     Ra196
1  .0       .0       .0       .0       K+ U(SO4)3=
1  .0       .0       .0       .0       K+ Pu(CO3)2-
1  .0       .0       .0       .0       K+ Pu(CO3)3--
1  .0       .0       .0       .0       K+ PuEDTA-
1  .0       .0       .0       .0       K+ CaCit-
1  .0       .0       .0       .0       K+ CaEDTA=
1  .0       .0       .0       .0       K+ UnuAn#2-
1  .0       .0       .0       .0       K+ UnuAn#3-
1  .0       .0       .0       .0       K+ UnuAn#4-
1  .0       .0       .0       .0       K+ U(OH)2(CO3)2-
1  .0       .0       .0       .0       K+ MgCit-
1  .0       .0       .0       .0       K+ MgEDTA=
1  .0       .0       .0       .0       K+ UnuAn#1-

1  .3159    1.614    .0      -.00034   Ca++ Cl-            HMW84
2  .20      3.1873 -54.24     .0       Ca++ SO4=           HMW84
1  .2145    2.53     .0       .0       Ca++ HSO4-          HMW84
1 -.1747   -.2303   -5.72     .0       Ca++ OH-            HMW84
1  .4       2.977    .0       .0       Ca++ HCO3-          HMW84
2  .0       .0       .0       .0       Ca++ CO3=           HMW84
1  .0       .0       .0       .0       Ca++ B(OH)4-        FW86
1  .0       .0       .0       .0       Ca++ B3O3(OH)4-     FW86
2  .0       .0       .0       .0       Ca++ B4O5(OH)4=     FW86
1  .0       .0       .0       .0       Ca++ Br-
1  .0       .0       .0       .0       Ca++ Am(CO3)2-
3  .0       .0       .0       .0       Ca++ Am(CO3)3=-
1  .4511    1.756    .0      -.00500   Ca++ ClO4-          E91
1  .0       .0       .0       .0       Ca++ NpO2(OH)2-
1  .0       .0       .0       .0       Ca++ NpO2CO3-
3  .0       .0       .0       .0       Ca++ NpO2(CO3)2--
3  .0       .0       .0       .0       Ca++ NpO2(CO3)3=-
1  .0       .0       .0       .0       Ca++ H2PO4-
2  .0       .0       .0       .0       Ca++ HPO4=
3  .0       .0       .0       .0       Ca++ PO4---
2  .0       .0       .0       .0       Ca++ Th(SO4)3=
1  .0       .0       .0       .0       Ca++ Th(OH)3(CO3)-
3  .0       .0       .0       .0       Ca++ Th(CO3)5---
1  .0       .0       .0       .0       Ca++ HOx-
2  .0       .0       .0       .0       Ca++ Ox=
1  .0       .0       .0       .0       Ca++ Ac-
1  .0       .0       .0       .0       Ca++ Lac-
1  .0       .0       .0       .0       Ca++ H2Cit-
2  .0       .0       .0       .0       Ca++ HCit=
3  .0       .0       .0       .0       Ca++ Cit---
3  .0       .0       .0       .0       Ca++ H3EDTA-
3  .0       .0       .0       .0       Ca++ H2EDTA=
3  .0       .0       .0       .0       Ca++ HEDTA--
3  .0       .0       .0       .0       Ca++ EDTA---
3  .0       .0       .0       .0       Ca++ AmEDTA=-
2  .0       .0       .0       .0       Ca++ NpO2Cit=
3  .0       .0       .0       .0       Ca++ NpO2EDTA---
1  .0       .0       .0       .0       Ca++ NpO2Ox-
3  .0       .0       .0       .0       Ca++ U(OH)4(CO3)2--
3  .0       .0       .0       .0       Ca++ U(CO3)5---
2  .0       .0       .0       .0       Ca++ U(SO4)3=
1  .0       .0       .0       .0       Ca++ Pu(CO3)2-
```

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2  .0        .0        .0        .0        Ca++ Pu(CO3)3=-
1  .0        .0        .0        .0        Ca++ PuEDTA-
1  .0        .0        .0        .0        Ca++ CaCit-
3  .0        .0        .0        .0        Ca++ CaEDTA=
3  .0        .0        .0        .0        Ca++ UnuAn#2-
1  .0        .0        .0        .0        Ca++ UnuAn#3-
3  .0        .0        .0        .0        Ca++ UnuAn#4-
2  .0        .0        .0        .0        Ca++ U(OH)2(CO3)2=
1  .6        .0        .0        .0        Ca++ MgCit-
2  .0        .0        .0        .0        Ca++ MgEDTA=
1  .0        .0        .0        .0        Ca++ UnuAn#1-

1  .35235    1.6815    .0        .00519    Mg++ Cl-          HMW84
2  .2210     3.343     -37.23    .025      Mg++ SO4=         HMW84
1  .4746     1.729     .0        .0        Mg++ HSO4-        HMW84
1  .0        .0        .0        .0        Mg++ OH-          HMW84
1  .329      .80:2     .0        .0        Mg++ HCO3-        HMW84
2  .0        .0        .0        .0        Mg++ CO3=         HMW84
1  .0        .0        .0        .0        Mg++ B(OH)4-      EW86
1  .0        .0        .0        .0        Mg++ B3O3(OH)4-   EW86
2  .0        .0        .0        .0        Mg++ B4O5(OH)4=   EW86
1  .0        .0        .0        .0        Mg++ Br-
1  .0        .0        .0        .0        Mg++ Am(CO3)2-
3  .0        .0        .0        .0        Mg++ Am(CO3)3=-
1  .4961     2.608     .0        .009578   Mg++ ClO4-        P91
1  .0        .0        .0        .0        Mg++ NpO2(OH)2-
1  .10       .34       .0        .0        Mg++ NpO2CO3-       by analogy with Na+, K+ values
3  .48       4.4       .0        .0        Mg++ NpO2(CO3)2--   by analogy with Na+, K+ values
3 2.07      22.7      -48.      -.11       Mg++ NpO2(CO3)3---  average of Na+, K+ values
1  .0        .0        .0        .0        Mg++ H2PO4-
2  .0        .0        .0        .0        Mg++ HPO4=
3  .0        .0        .0        .0        Mg++ PO4--
2  .0        .0        .0        .0        Mg++ Th(SO4)3-
1  .0        .0        .0        .0        Mg++ Th(OH)3(CO3)-
3  .0        .0        .0        .0        Mg++ Th(CO3)5---
1  .0        .0        .0        .0        Mg++ HOx-
2  .0        .0        .0        .0        Mg++ Ox=
1  .0        .0        .0        .0        Mg++ Ac-
1  .0        .0        .0        .0        Mg++ Lac-
1  .0        .0        .0        .0        Mg++ H2Cit-
2  .0        .0        .0        .0        Mg++ HCit=
3  .0        .0        .0        .0        Mg++ Cit---
3  .0        .0        .0        .0        Mg++ H3EDTA-
3  .0        .0        .0        .0        Mg++ H2EDTA=
3  .0        .0        .0        .0        Mg++ HEDTA--
3  .0        .0        .0        .0        Mg++ EDTA---
3  .0        .0        .0        .0        Mg++ AmEDTA--
2  .0        .0        .0        .0        Mg++ NpO2Cit=
3  .0        .0        .0        .0        Mg++ NpO2EDTA---
1  .0        .0        .0        .0        Mg++ NpO2Ox-
3  .0        .0        .0        .0        Mg++ U(OH)4(CO3)2--
3  .0        .0        .0        .0        Mg++ U(CO3)5---
2  .0        .0        .0        .0        Mg++ U(SO4)3-
1  .0        .0        .0        .0        Mg++ Pu(CO3)2-
2  .0        .0        .0        .0        Mg++ Pu(CO3)3--
1  .0        .0        .0        .0        Mg++ PuEDTA-
1  .0        .0        .0        .0        Mg++ CaCit-
3  .0        .0        .0        .0        Mg++ CaEDTA=
3  .0        .0        .0        .0        Mg++ UnuAn#2-
1  .0        .0        .0        .0        Mg++ UnuAn#3-
2  .0        .0        .0        .0        Mg++ UnuAn#4-
2  .0        .0        .0        .0        Mg++ U(OH)2(CO3)2=
1  .0        .0        .0        .0        Mg++ MgCit-
2  .0        .0        .0        .0        Mg++ MgEDTA=
1  .0        .0        .0        .0        Mg++ UnuAn#1-

1 -.10       1.650     .0        .0        MgOH+ Cl-         HMW84
1  .0        .0        .0        .0        MgOH+ SO4=        HMW84
1  .0        .0        .0        .0        MgOH+ HSO4-       HMW84
1  .0        .0        .0        .0        MgOH+ OH-         HMW84
1  .0        .0        .0        .0        MgOH+ HCO3-       HMW84
1  .0        .0        .0        .0        MgOH+ CO3=        HMW84
1  .0        .0        .0        .0        MgOH+ B(OH)4-
1  .0        .0        .0        .0        MgOH+ B3O3(OH)4-
1  .0        .0        .0        .0        MgOH+ B4O5(OH)4=
1  .0        .0        .0        .0        MgOH+ Br-
1  .0        .0        .0        .0        MgOH+ Am(CO3)2-
1  .0        .0        .0        .0        MgOH+ Am(CO3)3--
1  .0        .0        .0        .0        MgOH+ ClO4-
1  .0        .0        .0        .0        MgOH+ NpO2(OH)2-
1  .0        .0        .0        .0        MgOH+ NpO2CO3-
1  .0        .0        .0        .0        MgOH+ NpO2(CO3)2--
1  .0        .0        .0        .0        MgOH+ NpO2(CO3)3---
1  .0        .0        .0        .0        MgOH+ H2PO4-
1  .0        .0        .0        .0        MgOH+ HPO4=
1  .0        .0        .0        .0        MgOH+ PO4--
1  .0        .0        .0        .0        MgOH+ Th(SO4)3-
1  .0        .0        .0        .0        MgOH+ Th(OH)3(CO3)-
1  .0        .0        .0        .0        MgOH+ Th(CO3)5---
1  .0        .0        .0        .0        MgOH+ HOx-
1  .0        .0        .0        .0        MgOH+ Ox=
1  .0        .0        .0        .0        MgOH+ Ac-
1  .0        .0        .0        .0        MgOH+ Lac-
1  .0        .0        .0        .0        MgOH+ H2Cit-
1  .0        .0        .0        .0        MgOH+ HCit=
1  .0        .0        .0        .0        MgOH+ Cit---
1  .0        .0        .0        .0        MgOH+ H3EDTA-
1  .0        .0        .0        .0        MgOH+ H2EDTA=
1  .0        .0        .0        .0        MgOH+ HEDTA--
1  .0        .0        .0        .0        MgOH+ EDTA---
1  .0        .0        .0        .0        MgOH+ AmEDTA--
1  .0        .0        .0        .0        MgOH+ NpO2Cit=
1  .0        .0        .0        .0        MgOH+ NpO2EDTA---
1  .0        .0        .0        .0        MgOH+ NpO2Ox-
1  .0        .0        .0        .0        MgOH+ U(OH)4(CO3)2--
1  .0        .0        .0        .0        MgOH+ U(CO3)5---
1  .0        .0        .0        .0        MgOH+ U(SO4)3-
1  .0        .0        .0        .0        MgOH+ Pu(CO3)2-
1  .0        .0        .0        .0        MgOH+ Pu(CO3)3--
1  .0        .0        .0        .0        MgOH+ PuEDTA-
1  .0        .0        .0        .0        MgOH+ CaCit-
1  .0        .0        .0        .0        MgOH+ CaEDTA=
1  .0        .0        .0        .0        MgOH+ UnuAn#2-
1  .0        .0        .0        .0        MgOH+ UnuAn#3-
1  .0        .0        .0        .0        MgOH+ UnuAn#4-
1  .0        .0        .0        .0        MgOH+ U(OH)2(CO3)2-
1  .0        .0        .0        .0        MgOH+ MgCit-
1  .0        .0        .0        .0        MgOH+ MgEDTA=
1  .0        .0        .0        .0        MgOH+ UnuAn#1-

1  .1775     .2945     .0        .0008     H+ Cl-            HMW84
1  .0298     .0        .0        .0438     H+ SO4=           HMW84
1  .2065     .5556     .0        .0        H+ HSO4-          HMW84
1  .0        .0        .0        .0        H+ OH-            HMW84
1  .0        .0        .0        .0        H+ HCO3-          HMW84
1  .0        .0        .0        .0        H+ CO3=           HMW84
1  .0        .0        .0        .0        H+ B(OH)4-        EW86
1  .0        .0        .0        .0        H+ B3O3(OH)4-     EW86
1  .0        .0        .0        .0        H+ B4O5(OH)4=     EW86
1  .0        .0        .0        .0        H+ Br-
1  .0        .0        .0        .0        H+ Am(CO3)2-
1  .0        .0        .0        .0        H+ Am(CO3)3=-
1  .1747     .2931     .0        .00919    H+ ClO4-          P91
1  .0        .0        .0        .0        H+ NpO2(OH)2-
1  .0        .0        .0        .0        H+ NpO2CO3-
1  .0        .0        .0        .0        H+ NpO2(CO3)2=-
1  .0        .0        .0        .0        H+ NpO2(CO3)3---
1  .0        .0        .0        .0        H+ H2PO4-
1  .0        .0        .0        .0        H+ HPO4=
1  .0        .0        .0        .0        H+ PO4--
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1  .84      .0       .0       .0       H+ Th(SO4)3-      FR92
1  .0       .0       .0       .0       H+ Th(OH)3(CO3)-
1  .0       .0       .0       .0       H+ Th(CO3)5---
1  .0       .0       .0       .0       H+ HOx-
1  .0       .0       .0       .0       H+ Ox=
1  .0       .0       .0       .0       H+ Ac-
1  .0       .0       .0       .0       H+ Lac-
1  .0       .0       .0       .0       H+ H2Cit-
1  .0       .0       .0       .0       H+ HCit=
1  .0       .0       .0       .0       H+ Cit---
1  .0       .0       .0       .0       H+ H3EDTA-
1  .0       .0       .0       .0       H+ H2EDTA=
1  .0       .0       .0       .0       H+ HEDTA--
1  .0       .0       .0       .0       H+ EDTA---
1  .0       .0       .0       .0       H+ AmEDTA--
1  .0       .0       .0       .0       H+ NpO2Cit=
1  .0       .0       .0       .0       H+ NpO2EDTA---
1  .0       .0       .0       .0       H+ NpO2Ox=
1  .0       .0       .0       .0       H+ U(OH)4(CO3)2--
1  .0       .0       .0       .0       H+ U(CO3)5---
1  .0       .0       .0       .0       H+ U(SO4)3=
1  .0       .0       .0       .0       H+ Pu(CO3)2-
1  .0       .0       .0       .0       H+ Pu(CO3)3=-
1  .0       .0       .0       .0       H+ PuEDTA-
1  .0       .0       .0       .0       H+ CaCit-
1  .0       .0       .0       .0       H+ CaEDTA=
1  .0       .0       .0       .0       H+ UnuAn2-
1  .0       .0       .0       .0       H+ UnuAn3-
1  .0       .0       .0       .0       H+ UnuAn4-
1  .0       .0       .0       .0       H+ U(OH)2(CO3)2=
1  .0       .0       .0       .0       H+ MgCit-
1  .0       .0       .0       .0       H+ MgEDTA-
1  .0       .0       .0       .0       H+ UnuAn1-

1  .16      .0       .0       .0       MgB(OH)4+ Cl-     HMW84
1  .0       .0       .0       .0       MgB(OH)4+ SO4=    HMW84
1  .0       .0       .0       .0       MgB(OH)4+ HSO4-   HMW84
1  .0       .0       .0       .0       MgB(OH)4+ OH-     HMW84
1  .0       .0       .0       .0       MgB(OH)4+ HCO3-   HMW84
1  .0       .0       .0       .0       MgB(OH)4+ CO3=    HMW84
1  .0       .0       .0       .0       MgB(OH)4+ B(OH)4-
1  .0       .0       .0       .0       MgB(OH)4+ B3O3(OH)4-
1  .0       .0       .0       .0       MgB(OH)4+ B4O5(OH)4=
1  .0       .0       .0       .0       MgB(OH)4+ Br-
1  .0       .0       .0       .0       MgB(OH)4+ Am(CO3)2-
1  .0       .0       .0       .0       MgB(OH)4+ Am(CO3)3=-
1  .0       .0       .0       .0       MgB(OH)4+ ClO4-
1  .0       .0       .0       .0       MgB(OH)4+ NpO2(OH)2-
1  .0       .0       .0       .0       MgB(OH)4+ NpO2CO3-
1  .0       .0       .0       .0       MgB(OH)4+ NpO2(CO3)2=-
1  .0       .0       .0       .0       MgB(OH)4+ NpO2(CO3)3---
1  .0       .0       .0       .0       MgB(OH)4+ H2PO4-
1  .0       .0       .0       .0       MgB(OH)4+ HPO4=
1  .0       .0       .0       .0       MgB(OH)4+ PO4---
1  .0       .0       .0       .0       MgB(OH)4+ Th(SO4)3=
1  .0       .0       .0       .0       MgB(OH)4+ Th(OH)3(CO3)-
1  .0       .0       .0       .0       MgB(OH)4+ Th(CO3)5---
1  .0       .0       .0       .0       MgB(OH)4+ HOx-
1  .0       .0       .0       .0       MgB(OH)4+ Ox=
1  .0       .0       .0       .0       MgB(OH)4+ Ac-
1  .0       .0       .0       .0       MgB(OH)4+ Lac-
1  .0       .0       .0       .0       MgB(OH)4+ H2Cit-
1  .0       .0       .0       .0       MgB(OH)4+ HCit=
1  .0       .0       .0       .0       MgB(OH)4+ Cit---
1  .0       .0       .0       .0       MgB(OH)4+ H3EDTA-
1  .0       .0       .0       .0       MgB(OH)4+ H2EDTA=
1  .0       .0       .0       .0       MgB(OH)4+ HEDTA--
1  .0       .0       .0       .0       MgB(OH)4+ EDTA---
1  .0       .0       .0       .0       MgB(OH)4+ AmEDTA--
1  .0       .0       .0       .0       MgB(OH)4+ NpO2Cit=
1  .0       .0       .0       .0       MgB(OH)4+ NpO2EDTA---
1  .0       .0       .0       .0       MgB(OH)4+ NpO2Ox=
1  .0       .0       .0       .0       MgB(OH)4+ U(OH)4(CO3)2--
1  .0       .0       .0       .0       MgB(OH)4+ U(CO3)5---
1  .0       .0       .0       .0       MgB(OH)4+ U(SO4)3=
1  .0       .0       .0       .0       MgB(OH)4+ Pu(CO3)2-
1  .0       .0       .0       .0       MgB(OH)4+ Pu(CO3)3=-
1  .0       .0       .0       .0       MgB(OH)4+ PuEDTA-
1  .0       .0       .0       .0       MgB(OH)4+ CaCit-
1  .0       .0       .0       .0       MgB(OH)4+ CaEDTA=
1  .0       .0       .0       .0       MgB(OH)4+ UnuAn2-
1  .0       .0       .0       .0       MgB(OH)4+ UnuAn3-
1  .0       .0       .0       .0       MgB(OH)4+ UnuAn4-
1  .0       .0       .0       .0       MgB(OH)4+ U(OH)2(CO3)2=
1  .0       .0       .0       .0       MgB(OH)4+ MgCit-
1  .0       .0       .0       .0       MgB(OH)4+ MgEDTA-
1  .0       .0       .0       .0       MgB(OH)4+ UnuAn1-

1  .12      .0       .0       .0       CaB(OH)4+ Cl-
1  .0       .0       .0       .0       CaB(OH)4+ SO4=    HMW84
1  .0       .0       .0       .0       CaB(OH)4+ HSO4-   HMW84
1  .0       .0       .0       .0       CaB(OH)4+ OH-     HMW84
1  .0       .0       .0       .0       CaB(OH)4+ HCO3-   HMW84
1  .0       .0       .0       .0       CaB(OH)4+ CO3-    HMW84
1  .0       .0       .0       .0       CaB(OH)4+ B(OH)4-
1  .0       .0       .0       .0       CaB(OH)4+ B3O3(OH)4-
1  .0       .0       .0       .0       CaB(OH)4+ B4O5(OH)4-
1  .0       .0       .0       .0       CaB(OH)4+ Br-
1  .0       .0       .0       .0       CaB(OH)4+ Am(CO3)2-
1  .0       .0       .0       .0       CaB(OH)4+ Am(CO3)3=-
1  .0       .0       .0       .0       CaB(OH)4+ ClO4-
1  .0       .0       .0       .0       CaB(OH)4+ NpO2(OH)2-
1  .0       .0       .0       .0       CaB(OH)4+ NpO2CO3-
1  .0       .0       .0       .0       CaB(OH)4+ NpO2(CO3)2=-
1  .0       .0       .0       .0       CaB(OH)4+ NpO2(CO3)3---
1  .0       .0       .0       .0       CaB(OH)4+ H2PO4-
1  .0       .0       .0       .0       CaB(OH)4+ HPO4=
1  .0       .0       .0       .0       CaB(OH)4+ PO4---
1  .0       .0       .0       .0       CaB(OH)4+ Th(SO4)3=
1  .0       .0       .0       .0       CaB(OH)4+ Th(OH)3(CO3)-
1  .0       .0       .0       .0       CaB(OH)4+ Th(CO3)5---
1  .0       .0       .0       .0       CaB(OH)4+ HOx-
1  .0       .0       .0       .0       CaB(OH)4+ Ox=
1  .0       .0       .0       .0       CaB(OH)4+ Ac-
1  .0       .0       .0       .0       CaB(OH)4+ Lac-
1  .0       .0       .0       .0       CaB(OH)4+ H2Cit-
1  .0       .0       .0       .0       CaB(OH)4+ HCit=
1  .0       .0       .0       .0       CaB(OH)4+ Cit---
1  .0       .0       .0       .0       CaB(OH)4+ H3EDTA-
1  .0       .0       .0       .0       CaB(OH)4+ H2EDTA=
1  .0       .0       .0       .0       CaB(OH)4+ HEDTA--
1  .0       .0       .0       .0       CaB(OH)4+ EDTA---
1  .0       .0       .0       .0       CaB(OH)4+ AmEDTA--
1  .0       .0       .0       .0       CaB(OH)4+ NpO2Cit=
1  .0       .0       .0       .0       CaB(OH)4+ NpO2EDTA---
1  .0       .0       .0       .0       CaB(OH)4+ NpO2Ox=
1  .0       .0       .0       .0       CaB(OH)4+ U(OH)4(CO3)2--
1  .0       .0       .0       .0       CaB(OH)4+ U(CO3)5---
1  .0       .0       .0       .0       CaB(OH)4+ U(SO4)3=
1  .0       .0       .0       .0       CaB(OH)4+ Pu(CO3)2-
1  .0       .0       .0       .0       CaB(OH)4+ Pu(CO3)3=-
1  .0       .0       .0       .0       CaB(OH)4+ PuEDTA-
1  .0       .0       .0       .0       CaB(OH)4+ CaCit-
1  .0       .0       .0       .0       CaB(OH)4+ CaEDTA=
1  .0       .0       .0       .0       CaB(OH)4+ UnuAn2-
1  .0       .0       .0       .0       CaB(OH)4+ UnuAn3-
1  .0       .0       .0       .0       CaB(OH)4+ UnuAn4-
1  .0       .0       .0       .0       CaB(OH)4+ U(OH)2(CO3)2=
1  .0       .0       .0       .0       CaB(OH)4+ MgCit-
1  .0       .0       .0       .0       CaB(OH)4+ MgEDTA=
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1  .0       .0       .0       .0       CaB(OH)4+ UnuAm#1-

1  .6117    5.403    .0    -0.0284     Am+++ Cl-          TASR89 (from NdCl3 values)
3 3.0390    .0     -2520    .0        Am+++ SO4=         RFF94
1  .0       .0       .0       .0       Am+++ HSO4-
1  .0       .0       .0       .0       Am+++ OH-
1  .0       .0       .0       .0       Am+++ HCO3-
3  .0       .0       .0       .0       Am+++ CO3=
1  .0       .0       .0       .0       Am+++ B(OH)4-
1  .0       .0       .0       .0       Am+++ B3O3(OH)4-
3  .0       .0       .0       .0       Am+++ B4O5(OH)4-
1  .0       .0       .0       .0       Am+++ Br-
1  .0       .0       .0       .0       Am+++ Am(CO3)2-
3  .0       .0       .0       .0       Am+++ Am(CO3)3=-
1  .80      5.35     .0    -0.0048     Am+++ ClO4-        RRF90
1  .0       .0       .0       .0       Am+++ NpO2(OH)2-
1  .0       .0       .0       .0       Am+++ NpO2CO3-
3  .0       .0       .0       .0       Am+++ NpO2(CO3)2=-
3  .0       .0       .0       .0       Am+++ NpO2(CO3)3=--
1  .0       .0     -92.9      .0       Am+++ H2PO4-       RFF94 (from Nd-H2PO4 value)
3  .0       .0       .0       .0       Am+++ HPO4=
3  .0       .0       .0       .0       Am+++ PO4=-
3  .0       .0       .0       .0       Am+++ Th(SO4)3-
1  .0       .0       .0       .0       Am+++ Th(OH)3(CO3)-
3  .0       .0       .0       .0       Am+++ Th(CO3)5===
1  .0       .0       .0       .0       Am+++ HOx-
3  .0       .0       .0       .0       Am+++ Ox=
1  .0       .0       .0       .0       Am+++ Ac-
1  .0       .0       .0       .0       Am+++ Lac-
1  .0       .0       .0       .0       Am+++ H2Cit-
3  .0       .0       .0       .0       Am+++ HCit=
3  .0       .0       .0       .0       Am+++ Cit--
3  .0       .0       .0       .0       Am+++ H3EDTA-
3  .0       .0       .0       .0       Am+++ H2EDTA=
3  .0       .0       .0       .0       Am+++ HEDTA=-
3  .0       .0       .0       .0       Am+++ EDTA==
3  .0       .0       .0       .0       Am+++ AmEDTA=-
3  .0       .0       .0       .0       Am+++ NpO2Cit=
3  .0       .0       .0       .0       Am+++ NpO2EDTA==-
1  .0       .0       .0       .0       Am+++ NpO2Ox-
3  .0       .0       .0       .0       Am+++ U(OH)4(CO3)2=-
3  .0       .0       .0       .0       Am+++ U(CO3)5---
3  .0       .0       .0       .0       Am+++ U(SO4)3=
1  .0       .0       .0       .0       Am+++ Pu(CO3)2-
3  .0       .0       .0       .0       Am+++ Pu(CO3)3=-
1  .0       .0       .0       .0       Am+++ PuEDTA-
1  .0       .0       .0       .0       Am+++ CaCit-
3  .0       .0       .0       .0       Am+++ CaEDTA=
3  .0       .0       .0       .0       Am+++ UnuAm#2-
1  .0       .0       .0       .0       Am+++ UnuAm#3-
3  .0       .0       .0       .0       Am+++ UnuAm#4-
3  .0       .0       .0       .0       Am+++ U(OH)2(CO3)2=
1  .0       .0       .0       .0       Am+++ MgCit-
3  .0       .0       .0       .0       Am+++ MgEDTA=
1  .0       .0       .0       .0       Am+++ UnuAm#1-

1  .0       .0       .0       .0       AmCO3+ Cl-
1  .0       .0       .0       .0       AmCO3+ SO4=
1  .0       .0       .0       .0       AmCO3+ HSO4-
1  .0       .0       .0       .0       AmCO3+ OH-
1  .0       .0       .0       .0       AmCO3+ HCO3-
1  .0       .0       .0       .0       AmCO3+ CO3=
1  .0       .0       .0       .0       AmCO3+ B(OH)4-
1  .0       .0       .0       .0       AmCO3+ B3O3(OH)4-
1  .0       .0       .0       .0       AmCO3+ B4O5(OH)4=
1  .0       .0       .0       .0       AmCO3+ Br-
1  .0       .0       .0       .0       AmCO3+ Am(CO3)2-
1  .0       .0       .0       .0       AmCO3+ Am(CO3)3=-
1  .0       .0       .0       .0       AmCO3+ ClO4-
1  .0       .0       .0       .0       AmCO3+ NpO2(OH)2-
1  .0       .0       .0       .0       AmCO3+ NpO2CO3-
1  .0       .0       .0       .0       AmCO3+ NpO2(CO3)2=-
1  .0       .0       .0       .0       AmCO3+ NpO2(CO3)3=--
1  .0       .0       .0       .0       AmCO3+ H2PO4-
1  .0       .0       .0       .0       AmCO3+ HPO4=
1  .0       .0       .0       .0       AmCO3+ PO4=-
1  .0       .0       .0       .0       AmCO3+ Th(SO4)3-
1  .0       .0       .0       .0       AmCO3+ Th(OH)3(CO3)-
1  .0       .0       .0       .0       AmCO3+ Th(CO3)5===
1  .0       .0       .0       .0       AmCO3+ HOx-
1  .0       .0       .0       .0       AmCO3+ Ox=
1  .0       .0       .0       .0       AmCO3+ Ac-
1  .0       .0       .0       .0       AmCO3+ Lac-
1  .0       .0       .0       .0       AmCO3+ H2Cit-
1  .0       .0       .0       .0       AmCO3+ HCit=
1  .0       .0       .0       .0       AmCO3+ Cit--
1  .0       .0       .0       .0       AmCO3+ H3EDTA-
1  .0       .0       .0       .0       AmCO3+ H2EDTA=
1  .0       .0       .0       .0       AmCO3+ HEDTA=-
1  .0       .0       .0       .0       AmCO3+ EDTA==
1  .0       .0       .0       .0       AmCO3+ AmEDTA=-
1  .0       .0       .0       .0       AmCO3+ NpO2Cit=
1  .0       .0       .0       .0       AmCO3+ NpO2EDTA==-
1  .0       .0       .0       .0       AmCO3+ NpO2Ox-
1  .0       .0       .0       .0       AmCO3+ U(OH)4(CO3)2=-
1  .0       .0       .0       .0       AmCO3+ U(CO3)5---
1  .0       .0       .0       .0       AmCO3+ U(SO4)3=
1  .0       .0       .0       .0       AmCO3+ Pu(CO3)2-
1  .0       .0       .0       .0       AmCO3+ Pu(CO3)3=-
1  .0       .0       .0       .0       AmCO3+ PuEDTA-
1  .0       .0       .0       .0       AmCO3+ CaCit-
1  .0       .0       .0       .0       AmCO3+ CaEDTA=
1  .0       .0       .0       .0       AmCO3+ UnuAm#2-
1  .0       .0       .0       .0       AmCO3+ UnuAm#3-
1  .0       .0       .0       .0       AmCO3+ UnuAm#4-
1  .0       .0       .0       .0       AmCO3+ U(OH)2(CO3)2=
1  .0       .0       .0       .0       AmCO3+ MgCit-
1  .0       .0       .0       .0       AmCO3+ MgEDTA=
1  .0       .0       .0       .0       AmCO3+ UnuAm#1-

1  1.092    13.7     -160.    -.112     Th++++ Cl-         Roy92
3  1.56     .0       .0       .0        Th++++ SO4=        PR92
1  1.44     .0       .0       .0        Th++++ HSO4-       PR92
1  .0       .0       .0       .0        Th++++ OH-
1  .0       .0       .0       .0        Th++++ HCO3-
3  .0       .0       .0       .0        Th++++ CO3=
1  .0       .0       .0       .0        Th++++ B(OH)4-
1  .0       .0       .0       .0        Th++++ B3O3(OH)4-
1  .0       .0       .0       .0        Th++++ B4O5(OH)4=
1  .0       .0       .0       .0        Th++++ Br-
1  .0       .0       .0       .0        Th++++ Am(CO3)2-
3  .0       .0       .0       .0        Th++++ Am(CO3)3=-
1  1.19     27.3     .0    -.057        Th++++ ClO4-       CFN960319
1  .0       .0       .0       .0        Th++++ NpO2(OH)2-
1  .0       .0       .0       .0        Th++++ NpO2CO3-
3  .0       .0       .0       .0        Th++++ NpO2(CO3)2=-
3  .0       .0       .0       .0        Th++++ NpO2(CO3)3=--
1  .0       .0       .0       .0        Th++++ H2PO4-
3  .0       .0       .0       .0        Th++++ HPO4=
3  .0       .0       .0       .0        Th++++ PO4=-
3  .0       .0       .0       .0        Th++++ Th(SO4)3=
1  .0       .0       .0       .0        Th++++ Th(OH)3(CO3)-
3  .0       .0       .0       .0        Th++++ Th(CO3)5===
1  .0       .0       .0       .0        Th++++ HOx-
3  .0       .0       .0       .0        Th++++ Ox=
1  .0       .0       .0       .0        Th++++ Ac-
1  .0       .0       .0       .0        Th++++ Lac-
1  .0       .0       .0       .0        Th++++ H2Cit-
3  .0       .0       .0       .0        Th++++ HCit=
3  .0       .0       .0       .0        Th++++ Cit--
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3  .0       .0       .0       .0       Th++++ H3EDTA-
3  .0       .0       .0       .0       Th++++ H2EDTA=
3  .0       .0       .0       .0       Th++++ HEDTA=-
3  .0       .0       .0       .0       Th++++ EDTA==
3  .0       .0       .0       .0       Th++++ AmEDTA=-
3  .0       .0       .0       .0       Th++++ NpO2Cit=
3  .0       .0       .0       .0       Th++++ NpO2EDTA---
1  .0       .0       .0       .0       Th++++ NpO2Ox-
3  .0       .0       .0       .0       Th++++ U(OH)4(CO3)2==
3  .0       .0       .0       .0       Th++++ U(CO3)5---
3  .0       .0       .0       .0       Th++++ U(SO4)3=
1  .0       .0       .0       .0       Th++++ Pu(CO3)2-
3  .0       .0       .0       .0       Th++++ Pu(CO3)3=-
1  .0       .0       .0       .0       Th++++ PuEDTA-
1  .0       .0       .0       .0       Th++++ CaCit-
3  .0       .0       .0       .0       Th++++ CaEDTA=
3  .0       .0       .0       .0       Th++++ UnuAn#2-
1  .0       .0       .0       .0       Th++++ UnuAn#3-
3  .0       .0       .0       .0       Th++++ UnuAn#4-
3  .0       .0       .0       .0       Th++++ U(OH)2(CO3)2=
1  .0       .0       .0       .0       Th++++ MgCit-
3  .0       .0       .0       .0       Th++++ MgEDTA=
1  .0       .0       .0       .0       Th++++ UnuAn#1-

1  .6117    5.403    .0    -0.0284     Pu+++ Cl-          FRSR89 (from NdCl3 values)
3 3.0398    .0      -2500    .0        Pu+++ SO4=         RFF94
1  .0       .0       .0       .0       Pu+++ HSO4-
1  .0       .0       .0       .0       Pu+++ OH-
1  .0       .0       .0       .0       Pu+++ HCO3-
3  .0       .0       .0       .0       Pu+++ CO3=
1  .0       .0       .0       .0       Pu+++ B(OH)4-
1  .0       .0       .0       .0       Pu+++ B3O3(OH)4-
3  .0       .0       .0       .0       Pu+++ B4O5(OH)4=
1  .0       .0       .0       .0       Pu+++ Br-
1  .0       .0       .0       .0       Pu+++ Pu(CO3)2-
3  .0       .0       .0       .0       Pu+++ Pu(CO3)3--
1  .80      5.35     .0    -0.0049     Pu+++ ClO4-        RFF90
1  .0       .0       .0       .0       Pu+++ NpO2(OH)2-
1  .0       .0       .0       .0       Pu+++ NpO2CO3-
3  .0       .0       .6       .0       Pu+++ NpO2(CO3)2=-
3  .0       .0       .6       .0       Pu+++ NpO2(CO3)3==-
1  .0       .0     -92.9      .0       Pu+++ H2PO4-       RFF94 (from Nd-H2PO4 value)
3  .0       .0       .0       .0       Pu+++ HPO4-
3  .0       .0       .0       .0       Pu+++ PO4=-
3  .0       .0       .0       .0       Pu+++ Th(SO4)3=
1  .0       .0       .0       .0       Pu+++ Th(OH)3(CO3)-
3  .0       .0       .0       .0       Pu+++ Th(CO3)5===
1  .0       .0       .0       .0       Pu+++ HOx-
3  .0       .0       .0       .0       Pu+++ Ox=
1  .0       .0       .0       .0       Pu+++ Ac-
1  .0       .0       .0       .0       Pu+++ Lac-
1  .0       .0       .0       .0       Pu+++ H2Cit-
3  .0       .0       .0       .0       Pu+++ HCit=
3  .0       .0       .0       .0       Pu+++ Cit==
3  .0       .0       .0       .0       Pu+++ H3EDTA-
3  .0       .0       .0       .0       Pu+++ H2EDTA=
2  .0       .0       .0       .0       Pu+++ HEDTA=-
3  .0       .0       .0       .0       Pu+++ EDTA==
3  .0       .0       .0       .0       Pu+++ PuEDTA-
3  .0       .0       .0       .0       Pu+++ NpO2Cit=
3  .0       .0       .0       .0       Pu+++ NpO2EDTA==
1  .0       .0       .0       .0       Pu+++ NpO2Ox-
3  .0       .0       .0       .0       Pu+++ U(OH)4(CO3)2--
3  .0       .0       .0       .0       Pu+++ U(CO3)5===
3  .0       .0       .0       .0       Pu+++ U(SO4)3=
1  .0       .0       .0       .0       Pu+++ Pu(CO3)2-
3  .0       .0       .0       .0       Pu+++ Pu(CO3)3=-
1  .0       .0       .0       .0       Pu+++ PuEDTA-
1  .0       .0       .0       .0       Pu+++ CaCit-
3  .0       .0       .0       .0       Pu+++ CaEDTA=
3  .0       .0       .0       .0       Pu+++ UnuAn#2-
1  .0       .0       .0       .0       Pu+++ UnuAn#3-
3  .0       .0       .0       .0       Pu+++ UnuAn#4-
3  .0       .0       .0       .0       Pu+++ U(OH)2(CO3)2=
1  .0       .0       .0       .0       Pu+++ MgCit-
3  .0       .0       .0       .0       Pu+++ MgEDTA=
1  .0       .0       .0       .0       Pu+++ UnuAn#1-

1  .1415    .281     .0       .0       NpO2+ Cl-          NPRK95
1  .0       .0       .0       .0       NpO2+ SO4=
1  .0       .0       .0       .0       NpO2+ HSO4-
1  .0       .0       .0       .0       NpO2+ OH-
1  .0       .0       .0       .0       NpO2+ HCO3-
1  .0       .0       .0       .0       NpO2+ CO3=
1  .0       .0       .0       .0       NpO2+ B(OH)4-
1  .0       .0       .0       .0       NpO2+ B3O3(OH)4-
1  .0       .0       .0       .0       NpO2+ B4O5(OH)4-
1  .0       .0       .0       .0       NpO2+ Br-
1  .0       .0       .0       .0       NpO2+ Am(CO3)2-
1  .0       .0       .0       .0       NpO2+ Am(CO3)3--
1  .257     .180     .0       .0081    NpO2+ ClO4-        NPRK95
1  .0       .0       .0       .0       NpO2+ NpO2(OH)2-
1  .0       .0       .0       .0       NpO2+ NpO2CO3-
1  .0       .0       .0       .0       NpO2+ NpO2(CO3)2=-
1  .0       .0       .0       .0       NpO2+ NpO2(CO3)3==-
1  .0       .0       .0       .0       NpO2+ H2PO4-
1  .0       .0       .0       .0       NpO2+ HPO4=
1  .0       .0       .0       .0       NpO2+ PO4=-
1  .0       .0       .0       .0       NpO2+ Th(SO4)3-
1  .0       .0       .0       .0       NpO2+ Th(OH)3(CO3)-
1  .0       .0       .0       .0       NpO2+ Th(CO3)5===
1  .0       .0       .0       .0       NpO2+ HOx-
1  .0       .0       .0       .0       NpO2+ Ox=
1  .0       .0       .0       .0       NpO2+ Ac-
1  .0       .0       .0       .0       NpO2+ Lac-
1  .0       .0       .0       .0       NpO2+ H2Cit-
1  .0       .0       .0       .0       NpO2+ HCit=
1  .0       .0       .0       .0       NpO2+ Cit==
1  .0       .0       .0       .0       NpO2+ H3EDTA-
1  .0       .0       .0       .0       NpO2+ H2EDTA-
1  .0       .0       .0       .0       NpO2+ HEDTA=-
1  .0       .0       .0       .0       NpO2+ EDTA==
1  .0       .0       .0       .0       NpO2+ AmEDTA=-
1  .0       .0       .0       .0       NpO2+ NpO2Cit=
1  .0       .0       .0       .0       NpO2+ NpO2EDTA==
1  .0       .0       .0       .0       NpO2+ NpO2Ox-
1  .0       .0       .0       .0       NpO2+ U(OH)4(CO3)2==
1  .0       .0       .0       .0       NpO2+ U(CO3)5===
1  .0       .0       .0       .0       NpO2+ U(SO4)3=
1  .0       .0       .0       .0       NpO2+ Pu(CO3)2-
1  .0       .0       .0       .0       NpO2+ Pu(CO3)3=-
1  .0       .0       .0       .0       NpO2+ PuEDTA-
1  .0       .0       .0       .0       NpO2+ CaCit-
1  .0       .0       .0       .0       NpO2+ CaEDTA=
1  .0       .0       .0       .0       NpO2+ UnuAn#2-
1  .0       .0       .0       .0       NpO2+ UnuAn#3-
1  .0       .0       .0       .0       NpO2+ UnuAn#4-
1  .0       .0       .0       .0       NpO2+ U(OH)2(CO3)2=
1  .0       .0       .0       .0       NpO2+ MgCit-
1  .0       .0       .0       .0       NpO2+ MgEDTA=
1  .0       .0       .0       .0       NpO2+ UnuAn#1-

1 1.644    15.5     .0       .1       U++++ Cl-          RESMMN
3  .0       .0       .0       .0       U++++ SO4=
1  .0       .0       .0       .0       U++++ HSO4-
1  .0       .0       .0       .0       U++++ OH-
1  .0       .0       .0       .0       U++++ HCO3-
3  .0       .0       .0       .0       U++++ CO3=
1  .0       .0       .0       .0       U++++ B(OH)4-
1  .0       .0       .0       .0       U++++ B3O3(OH)4-
```

```
3  .0       .0       .0       .0       U++++ B4O5(OH)4-
1  .0       .0       .0       .0       U++++ Br-
1  .0       .0       .0       .0       U++++ Am(CO3)2-
3  .0       .0       .0       .0       U++++ Am(CO3)3=-
1  .0       .0       .0       .0       U++++ ClO4-
1  .0       .0       .0       .0       U++++ NpO2(OH)2-
1  .0       .0       .0       .0       U++++ NpO2CO3-
3  .0       .0       .0       .0       U++++ NpO2(CO3)2=-
3  .0       .0       .0       .0       U++++ NpO2(CO3)3=--
1  .0       .0       .0       .0       U++++ H2PO4-
3  .0       .0       .0       .0       U++++ HPO4=
3  .0       .0       .0       .0       U++++ PO4=-
3  .0       .0       .0       .0       U++++ Th(SO4)3=
1  .0       .0       .0       .0       U++++ Th(OH)3(CO3)-
3  .0       .0       .0       .0       U++++ Th(CO3)5=--
1  .0       .0       .0       .0       U++++ HOx-
3  .0       .0       .0       .0       U++++ Ox=
1  .0       .0       .0       .0       U++++ Ac-
1  .0       .0       .0       .0       U++++ Lac-
1  .0       .0       .0       .0       U++++ H2Cit-
3  .0       .0       .0       .0       U++++ HCit=
3  .0       .0       .0       .0       U++++ Cit--
3  .0       .0       .0       .0       U++++ H3EDTA-
3  .0       .0       .0       .0       U++++ H2EDTA=
3  .0       .0       .0       .0       U++++ HEDTA--
3  .0       .0       .0       .0       U++++ EDTA---
3  .0       .0       .0       .0       U++++ AmEDTA=-
3  .0       .0       .0       .0       U+++1 NpO2Cit=
3  .0       .0       .0       .0       U++++ NpO2EDTA---
1  .0       .0       .0       .0       U++++ NpO2Ox-
3  .0       .0       .0       .0       U++++ U(OH)4(CO3)2=-
3  .0       .0       .0       .0       U++++ U(CO3)5---
3  .0       .0       .0       .0       U++++ U(SO4)3=
1  .0       .0       .0       .0       U++++ Pu(CO3)2-
3  .0       .0       .0       .0       U++++ Pu(CO3)3=-
1  .0       .0       .0       .0       U++++ PuEDTA-
1  .0       .0       .0       .0       U++++ CaCit-
3  .0       .0       .0       .0       U++++ CaEDTA=
3  .0       .0       .0       .0       U++++ UnuAn#2-
3  .0       .0       .0       .0       U++++ UnuAn#3=
3  .0       .0       .0       .0       U++++ UnuAn#4-
3  .0       .0       .0       .0       U++++ U(OH)2(CO3)2=
1  .0       .0       .0       .0       U++++ MgCit-
3  .0       .0       .0       .0       U++++ MgEDTA-
1  .0       .0       .0       .0       U++++ UnuAn#1-

1 1.0      7.856    .0       .0       UOH+++ Cl-          RFSMMN
3  .0       .0       .0       .0       UOH+++ SO4=
1  .0       .0       .0       .0       UOH+++ HSO4-
1  .0       .0       .0       .0       UOH+++ OH-
1  .0       .0       .0       .0       UOH+++ HCO3-
3  .0       .0       .0       .0       UOH+++ CO3=
1  .0       .0       .0       .0       UOH+++ B(OH)4-
1  .0       .0       .0       .0       UOH+++ B3O3(OH)4-
3  .0       .0       .0       .0       UOH+++ B4O5(OH)4=
1  .0       .0       .0       .0       UOH+++ Br-
1  .0       .0       .0       .0       UOH+++ Am(CO3)2-
3  .0       .0       .0       .0       UOH+++ Am(CO3)3=-
1  .0       .0       .0       .0       UOH+++ ClO4-
1  .0       .0       .0       .0       UOH+++ NpO2(OH)2-
1  .0       .0       .0       .0       UOH+++ NpO2CO3-
3  .0       .0       .0       .0       UOH+++ NpO2(CO3)2=-
3  .0       .0       .0       .0       UOH+++ NpO2(CO3)3=--
1  .0       .0       .0       .0       UOH+++ H2PO4-
3  .0       .0       .0       .0       UOH+++ HPO4=
3  .0       .0       .0       .0       UOH+++ PO4=-
3  .0       .0       .0       .0       UOH+++ Th(SO4)3-
1  .0       .0       .0       .0       UOH+++ Th(OH)3(CO3)-
3  .0       .0       .0       .0       UOH+++ Th(CO3)5=--
1  .0       .0       .0       .0       UOH+++ HOx-
3  .0       .0       .0       .0       UOH+++ Ox=
1  .0       .0       .0       .0       UOH+++ Ac-
1  .0       .0       .0       .0       UOH+++ Lac-
1  .0       .0       .0       .0       UOH+++ H2Cit-
3  .0       .0       .0       .0       UOH+++ HCit=
3  .0       .0       .0       .0       UOH+++ Cit---
3  .0       .0       .0       .0       UOH+++ H3EDTA-
3  .0       .0       .0       .0       UOH+++ H2EDTA=
3  .0       .0       .0       .0       UOH+++ HEDTA--
3  .0       .0       .0       .0       UOH+++ EDTA----
3  .0       .0       .0       .0       UOH+++ AmEDTA=-
3  .0       .0       .0       .0       UOH+++ NpO2Cit=
3  .0       .0       .0       .0       UOH+++ NpO2EDTA---
1  .0       .0       .0       .0       UOH+++ NpO2Ox-
3  .0       .0       .0       .0       UOH+++ U(OH)4(CO3)2=-
3  .0       .0       .0       .0       UOH+++ U(CO3)5---
3  .0       .0       .0       .0       UOH+++ U(SO4)3=
1  .0       .0       .0       .0       UOH+++ Pu(CO3)2-
3  .0       .0       .0       .0       UOH+++ Pu(CO3)3=-
1  .0       .0       .0       .0       UOH+++ PuEDTA-
1  .0       .0       .0       .0       UOH+++ CaCit-
3  .0       .0       .0       .0       UOH+++ CaEDTA=
3  .0       .0       .0       .0       UOH+++ UnuAn#2-
1  .0       .0       .0       .0       UOH+++ UnuAn#3-
3  .0       .0       .0       .0       UOH+++ UnuAn#4-
3  .0       .0       .0       .0       UOH+++ U(OH)2(CO3)2=
1  .0       .0       .0       .0       UOH+++ MgCit-
3  .0       .0       .0       .0       UOH+++ MgEDTA=
1  .0       .0       .0       .0       UOH+++ UnuAn#1-

1  1.239    4.934    .0       .0       UAc+++ Cl-          analogy w/ThAc++++
3  .0       .0       .0       .0       UAc+++ SO4=
1  .0       .0       .0       .0       UAc+++ HSO4-
1  .0       .0       .0       .0       UAc+++ OH-
1  .0       .0       .0       .0       UAc+++ HCO3-
3  .0       .0       .0       .0       UAc+++ CO3=
1  .0       .0       .0       .0       UAc+++ B(OH)4-
1  .0       .0       .0       .0       UAc+++ B3O3(OH)4-
3  .0       .0       .0       .0       UAc+++ B4O5(OH)4=
1  .0       .0       .0       .0       UAc+++ Br-
1  .0       .0       .0       .0       UAc+++ Am(CO3)2-
3  .0       .0       .0       .0       UAc+++ Am(CO3)3=-
1  .0       .0       .0       .0       UAc+++ ClO4-
1  .0       .0       .0       .0       UAc+++ NpO2(OH)2-
1  .0       .0       .0       .0       UAc+++ NpO2CO3-
3  .0       .0       .0       .0       UAc+++ NpO2(CO3)2=-
3  .0       .0       .0       .0       UAc+++ NpO2(CO3)3=--
1  .0       .0       .0       .0       UAc+++ H2PO4-
3  .0       .0       .0       .0       UAc+++ HPO4=
3  .0       .0       .0       .0       UAc+++ PO4=-
3  .0       .0       .0       .0       UAc+++ Th(SO4)3=
1  .0       .0       .0       .0       UAc+++ Th(OH)3(CO3)-
3  .0       .0       .0       .0       UAc+++ Th(CO3)5=--
1  .0       .0       .0       .0       UAc+++ HOx-
1  .0       .0       .0       .0       UAc+++ Ox=
1  .0       .0       .0       .0       UAc+++ Ac-
1  .0       .0       .0       .0       UAc+++ Lac-
1  .0       .0       .0       .0       UAc+++ H2Cit-
3  .0       .0       .0       .0       UAc+++ HCit=
3  .0       .0       .0       .0       UAc+++ Cit---
3  .0       .0       .0       .0       UAc+++ H3EDTA-
3  .0       .0       .0       .0       UAc+++ H2EDTA=
3  .0       .0       .0       .0       UAc+++ HEDTA--
3  .0       .0       .0       .0       UAc+++ EDTA----
3  .0       .0       .0       .0       UAc+++ AmEDTA=-
3  .0       .0       .0       .0       UAc+++ NpO2Cit=
3  .0       .0       .0       .0       UAc+++ NpO2EDTA---
1  .0       .0       .0       .0       UAc+++ NpO2Ox-
3  .0       .0       .0       .0       UAc+++ U(OH)4(CO3)2=-
3  .0       .0       .0       .0       UAc+++ U(CO3)5---
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```
3  .0       .0       .0       .0       UAc+++ U(SO4)3-
1  .0       .0       .0       .0       UAc+++ Pu(CO3)2-
3  .0       .0       .0       .0       UAc+++ Pu(CO3)3--
1  .0       .0       .0       .0       UAc+++ PuEDTA-
1  .0       .0       .0       .0       UAc+++ CaCit-
3  .0       .0       .0       .0       UAc+++ CaEDTA-
3  .0       .0       .0       .0       UAc+++ UnuAn#2-
1  .0       .0       .0       .0       UAc+++ UnuAn#3-
3  .0       .0       .0       .0       UAc+++ UnuAn#4-
3  .0       .0       .0       .0       UAc+++ U(OH)2(CO3)2=
1  .0       .0       .0       .0       UAc+++ MgCit-
3  .0       .0       .0       .0       UAc+++ MgEDTA=
1  .0       .0       .0       .0       UAc+++ UnuAn#1-

1 -.2061    -.525    .0       .0       ThOx++ Cl-            RCM96
2  .0       .0       .0       .0       ThOx++ SO4=
1  .0       .0       .0       .0       ThOx++ HSO4-
1  .0       .0       .0       .0       ThOx++ OH-
1  .0       .0       .0       .0       ThOx++ HCO3-
2  .0       .0       .0       .0       ThOx++ CO3=
1  .0       .0       .0       .0       ThOx++ B(OH)4-
1  .0       .0       .0       .0       ThOx++ B3O3(OH)4-
2  .0       .0       .0       .0       ThOx++ B4O5(OH)4=
1  .0       .0       .0       .0       ThOx++ Br-
1  .0       .0       .0       .0       ThOx++ Am(CO3)2-
3  .0       .0       .0       .0       ThOx++ Am(CO3)3=-
1  .0       .0       .0       .0       ThOx++ ClO4-
1  .0       .0       .0       .0       ThOx++ NpO2(OH)2-
1  .0       .0       .0       .0       ThOx++ NpO2CO3-
3  .0       .0       .0       .0       ThOx++ NpO2(CO3)2=-
3  .0       .0       .0       .0       ThOx++ NpO2(CO3)3=--
1  .0       .0       .0       .0       ThOx++ H2PO4-
2  .0       .0       .0       .0       ThOx++ HPO4=
3  .0       .0       .0       .0       ThOx++ PO4=-
2  .0       .0       .0       .0       ThOx++ Th(SO4)3=
1  .0       .0       .0       .0       ThOx++ Th(OH)3(CO3)-
3  .0       .0       .0       .0       ThOx++ Th(CO3)5===
1  .0       .0       .0       .0       ThOx++ HOx-
2  .0       .0       .0       .0       ThOx++ Ox=
1  .0       .0       .0       .0       ThOx++ Ac-
1  .0       .0       .0       .0       ThOx++ Lac-
1  .0       .0       .0       .0       ThOx++ H2Cit-
2  .0       .0       .0       .0       ThOx++ HCit=
3  .0       .0       .0       .0       ThOx++ Cit---
3  .0       .0       .0       .0       ThOx++ H3EDTA-
3  .0       .0       .0       .0       ThOx++ H2EDTA=
3  .0       .0       .0       .0       ThOx++ HEDTA--
3  .0       .0       .0       .0       ThOx++ EDTA---
3  .0       .0       .0       .0       ThOx++ AmEDTA--
2  .0       .0       .0       .0       ThOx++ NpO2Cit=
3  .0       .0       .0       .0       ThOx++ NpO2EDTA---
1  .0       .0       .0       .0       ThOx++ NpO2Ox-
3  .0       .0       .0       .0       ThOx++ U(OH)4(CO3)2==
3  .0       .0       .0       .0       ThOx++ U(CO3)5===
2  .0       .0       .0       .0       ThOx++ U(SO4)3=
1  .0       .0       .0       .0       ThOx++ Pu(CO3)2-
2  .0       .0       .0       .0       ThOx++ Pu(CO3)3=-
1  .0       .0       .0       .0       ThOx++ PuEDTA-
1  .0       .0       .0       .0       ThOx++ CaCit-
2  .0       .0       .0       .0       ThOx++ CaEDTA=
3  .0       .0       .0       .0       ThOx++ UnuAn#2-
1  .0       .0       .0       .0       ThOx++ UnuAn#3-
2  .0       .0       .0       .0       ThOx++ UnuAn#4-
2  .0       .0       .0       .0       ThOx++ U(OH)2(CO3)2=
1  .0       .0       .0       .0       ThOx++ MgCit-
2  .0       .0       .0       .0       ThOx++ MgEDTA=
1  .0       .0       .0       .0       ThOx++ UnuAn#1-

1  .227     2.154    .0      -.102     AmAc++ Cl-            RCM96
2  .0       .0       .0       .0       AmAc++ SO4=
1  .0       .0       .0       .0       AmAc++ HSO4-
1  .0       .0       .0       .0       AmAc++ OH-
1  .0       .0       .0       .0       AmAc++ HCO3-
2  .0       .0       .0       .0       AmAc++ CO3=
1  .0       .0       .0       .0       AmAc++ B(OH)4-
1  .0       .0       .0       .0       AmAc++ B3O3(OH)4-
2  .0       .0       .0       .0       AmAc++ B4O5(OH)4=
1  .0       .0       .0       .0       AmAc++ Br-
1  .0       .0       .0       .0       AmAc++ Am(CO3)2-
3  .0       .0       .0       .0       AmAc++ Am(CO3)3=-
1  .0       .0       .0       .0       AmAc++ ClO4-
1  .0       .0       .0       .0       AmAc++ NpO2(OH)2-
1  .0       .0       .0       .0       AmAc++ NpO2CO3-
3  .0       .0       .0       .0       AmAc++ NpO2(CO3)2=-
3  .0       .0       .0       .0       AmAc++ NpO2(CO3)3=--
1  .0       .0       .0       .0       AmAc++ H2PO4-
2  .0       .0       .0       .0       AmAc++ HPO4=
3  .0       .0       .0       .0       AmAc++ PO4=-
2  .0       .0       .0       .0       AmAc++ Th(SO4)3=
1  .0       .0       .0       .0       AmAc++ Th(OH)3(CO3)-
3  .0       .0       .0       .0       AmAc++ Th(CO3)5===
1  .0       .0       .0       .0       AmAc++ HOx-
2  .0       .0       .0       .0       AmAc++ Ox=
1  .0       .0       .0       .0       AmAc++ Ac-
1  .0       .0       .0       .0       AmAc++ Lac-
1  .0       .0       .0       .0       AmAc++ H2Cit-
2  .0       .0       .0       .0       AmAc++ HCit=
3  .0       .0       .0       .0       AmAc++ Cit---
3  .0       .0       .0       .0       AmAc++ H3EDTA-
3  .0       .0       .0       .0       AmAc++ H2EDTA=
3  .0       .0       .0       .0       AmAc++ HEDTA--
3  .0       .0       .0       .0       AmAc++ EDTA---
3  .0       .0       .0       .0       AmAc++ AmEDTA--
2  .0       .0       .0       .0       AmAc++ NpO2Cit=
3  .0       .0       .0       .0       AmAc++ NpO2EDTA---
1  .0       .0       .0       .0       AmAc++ NpO2Ox-
3  .0       .0       .0       .0       AmAc++ U(OH)4(CO3)2--
3  .0       .0       .0       .0       AmAc++ U(CO3)5===
2  .0       .0       .0       .0       AmAc++ U(SO4)3=
1  .0       .0       .0       .0       AmAc++ Pu(CO3)2-
2  .0       .0       .0       .0       AmAc++ Pu(CO3)3=-
1  .0       .0       .0       .0       AmAc++ PuEDTA-
1  .0       .0       .0       .0       AmAc++ CaCit-
2  .0       .0       .0       .0       AmAc++ CaEDTA=
3  .0       .0       .0       .0       AmAc++ UnuAn#2-
1  .0       .0       .0       .0       AmAc++ UnuAn#3-
2  .0       .0       .0       .0       AmAc++ UnuAn#4-
2  .0       .0       .0       .0       AmAc++ U(OH)2(CO3)2=
1  .0       .0       .0       .0       AmAc++ MgCit-
2  .0       .0       .0       .0       AmAc++ MgEDTA=
1  .0       .0       .0       .0       AmAc++ UnuAn#1-

1 -.0572    6.331    .0       .0       AmLac++ Cl-           RCM98
2  .0       .0       .0       .0       AmLac++ SO4=
1  .0       .0       .0       .0       AmLac++ HSO4-
1  .0       .0       .0       .0       AmLac++ OH-
1  .0       .0       .0       .0       AmLac++ HCO3-
2  .0       .0       .0       .0       AmLac++ CO3=
1  .0       .0       .0       .0       AmLac++ B(OH)4-
1  .0       .0       .0       .0       AmLac++ B3O3(OH)4-
2  .0       .0       .0       .0       AmLac++ B4O5(OH)4=
1  .0       .0       .0       .0       AmLac++ Br-
1  .0       .0       .0       .0       AmLac++ Am(CO3)2-
3  .0       .0       .0       .0       AmLac++ Am(CO3)3=-
1  .0       .0       .0       .0       AmLac++ ClO4-
1  .0       .0       .0       .0       AmLac++ NpO2(OH)2-
1  .0       .0       .0       .0       AmLac++ NpO2CO3-
3  .0       .0       .0       .0       AmLac++ NpO2(CO3)2=-
3  .0       .0       .0       .0       AmLac++ NpO2(CO3)3=--
1  .0       .0       .0       .0       AmLac++ H2PO4-
```

```
2  .0        .0        .0        .0        AmLac++ HPO4=
3  .0        .0        .0        .0        AmLac++ PO4--
2  .0        .0        .0        .0        AmLac++ Th(SO4)3=
1  .0        .0        .0        .0        AmLac++ Th(OH)3(CO3)-
3  .0        .0        .0        .0        AmLac++ Th(CO3)5---
1  .0        .0        .0        .0        AmLac++ HOx-
2  .0        .0        .0        .0        AmLac++ Ox=
1  .0        .0        .0        .0        AmLac++ Ac-
1  .0        .0        .0        .0        AmLac++ Lac-
1  .0        .0        .0        .0        AmLac++ H2Cit-
2  .0        .0        .0        .0        AmLac++ HCit=
3  .0        .0        .0        .0        AmLac++ Cit---
3  .0        .0        .0        .0        AmLac++ H3EDTA-
3  .0        .0        .0        .0        AmLac++ H2EDTA=
3  .0        .0        .0        .0        AmLac++ HEDTA--
3  .0        .0        .0        .0        AmLac++ EDTA===
3  .0        .0        .0        .0        AmLac++ AmEDTA==
2  .0        .0        .0        .0        AmLac++ NpO2Cit=
3  .0        .0        .0        .0        AmLac++ NpO2EDTA---
1  .0        .0        .0        .0        AmLac++ NpO2Ox-
3  .0        .0        .0        .0        AmLac++ U(OH)4(CO3)2==
3  .0        .0        .0        .0        AmLac++ U(CO3)5===
2  .0        .0        .0        .0        AmLac++ U(SO4)3-
1  .0        .0        .0        .0        AmLac++ Pu(CO3)2-
2  .0        .0        .0        .0        AmLac++ Pu(CO3)3=-
1  .0        .0        .0        .0        AmLac++ PuEDTA-
1  .0        .0        .0        .0        AmLac++ CaCit-
2  .0        .0        .0        .0        AmLac++ CaEDTA=
3  .0        .0        .0        .0        AmLac++ UnuAn#2-
1  .0        .0        .0        .0        AmLac++ UnuAn#3-
2  .0        .0        .0        .0        AmLac++ UnuAn#4-
2  .0        .0        .0        .0        AmLac++ U(OH)2(CO3)2=
1  .0        .0        .0        .0        AmLac++ MgCit-
2  .0        .0        .0        .0        AmLac++ MgEDTA=
1  .0        .0        .0        .0        AmLac++ UnuAn#1-

1 -.3219     .0        .0        .0        AmOx+ Cl-           RCM96
1  .0        .0        .0        .0        AmOx+ SO4=
1  .0        .0        .0        .0        AmOx+ HSO4-
1  .0        .0        .0        .0        AmOx+ OH-
1  .0        .0        .0        .0        AmOx+ HCO3-
1  .0        .0        .0        .0        AmOx+ CO3=
1  .0        .0        .0        .0        AmOx+ B(OH)4-
1  .0        .0        .0        .0        AmOx+ B3O3(OH)4-
2  .0        .0        .0        .0        AmOx+ B4O5(OH)4=
1  .0        .0        .0        .0        AmOx+ Br-
1  .0        .0        .0        .0        AmOx+ Am(CO3)2-
1  .0        .0        .0        .0        AmOx+ Am(CO3)3=-
1  .0        .0        .0        .0        AmOx+ ClO4-
1  .0        .0        .0        .0        AmOx+ NpO2(OH)2-
1  .0        .0        .0        .0        AmOx+ NpO2CO3-
1  .0        .0        .0        .0        AmOx+ NpO2(CO3)2=-
1  .0        .0        .0        .0        AmOx+ NpO2(CO3)3---
1  .0        .0        .0        .0        AmOx+ H2PO4-
1  .0        .0        .0        .0        AmOx+ HPO4=
1  .0        .0        .0        .0        AmOx+ PO4---
1  .0        .0        .0        .0        AmOx+ Th(SO4)3=
1  .0        .0        .0        .0        AmOx+ Th(OH)3(CO3)-
1  .0        .0        .0        .0        AmOx+ Th(CO3)5---
1  .0        .0        .0        .0        AmOx+ HOx-
2  .0        .0        .0        .0        AmOx+ Ox=
1  .0        .0        .0        .0        AmOx+ Ac-
1  .0        .0        .0        .0        AmOx+ Lac-
1  .0        .0        .0        .0        AmOx+ H2Cit-
1  .0        .0        .0        .0        AmOx+ HCit=
1  .0        .0        .0        .0        AmOx+ Cit---
1  .0        .0        .0        .0        AmOx+ H3EDTA-
1  .0        .0        .0        .0        AmOx+ H2EDTA=
1  .0        .0        .0        .0        AmOx+ HEDTA--
1  .0        .0        .0        .0        AmOx+ EDTA===
1  .0        .0        .0        .0        AmOx+ AmEDTA==
1  .0        .0        .0        .0        AmOx+ NpO2Cit=
1  .0        .0        .0        .0        AmOx+ NpO2EDTA---
1  .0        .0        .0        .0        AmOx+ NpO2Ox-
1  .0        .0        .0        .0        AmOx+ U(OH)4(CO3)2==
1  .0        .0        .0        .0        AmOx+ U(CO3)5===
1  .0        .0        .0        .0        AmOx+ U(SO4)3-
1  .0        .0        .0        .0        AmOx+ Pu(CO3)2-
1  .0        .0        .0        .0        AmOx+ Pu(CO3)3=-
1  .0        .0        .0        .0        AmOx+ PuEDTA-
1  .0        .0        .0        .0        AmOx+ CaCit-
1  .0        .0        .0        .0        AmOx+ CaEDTA=
1  .0        .0        .0        .0        AmOx+ UnuAn#2-
1  .0        .0        .0        .0        AmOx+ UnuAn#3-
1  .0        .0        .0        .0        AmOx+ UnuAn#4-
1  .0        .0        .0        .0        AmOx+ U(OH)2(CO3)2=
1  .0        .0        .0        .0        AmOx+ MgCit-
1  .0        .0        .0        .0        AmOx+ MgEDTA=
1  .0        .0        .0        .0        AmOx+ UnuAn#1-

1 -.604     -1.607     .0        .0        UCit+ Cl-
1  .0        .0        .0        .0        UCit+ SO4=
1  .0        .0        .0        .0        UCit+ HSO4-
1  .0        .0        .0        .0        UCit+ OH-
1  .0        .0        .0        .0        UCit+ HCO3-
1  .0        .0        .0        .0        UCit+ CO3=
1  .0        .0        .0        .0        UCit+ B(OH)4-
1  .0        .0        .0        .0        UCit+ B3O3(OH)4-
1  .0        .0        .0        .0        UCit+ B4O5(OH)4=
1  .0        .0        .0        .0        UCit+ Br-
1  .0        .0        .0        .0        UCit+ Am(CO3)2-
1  .0        .0        .0        .0        UCit+ Am(CO3)3=-
1  .0        .0        .0        .0        UCit+ ClO4-
1  .0        .0        .0        .0        UCit+ NpO2(OH)2-
1  .0        .0        .0        .0        UCit+ NpO2CO3-
1  .0        .0        .0        .0        UCit+ NpO2(CO3)2=-
1  .0        .0        .0        .0        UCit+ NpO2(CO3)3=--
1  .0        .0        .0        .0        UCit+ H2PO4-
1  .0        .0        .0        .0        UCit+ HPO4=
1  .0        .0        .0        .0        UCit+ PO4---
1  .0        .0        .0        .0        UCit+ Th(SO4)3=
1  .0        .0        .0        .0        UCit+ Th(OH)3(CO3)-
1  .0        .0        .0        .0        UCit+ Th(CO3)5---
1  .0        .0        .0        .0        UCit+ HOx-
1  .0        .0        .0        .0        UCit+ Ox=
1  .0        .0        .0        .0        UCit+ Ac-
1  .0        .0        .0        .0        UCit+ Lac-
1  .0        .0        .0        .0        UCit+ H2Cit-
1  .0        .0        .0        .0        UCit+ HCit=
1  .0        .0        .0        .0        UCit+ Cit---
1  .0        .0        .0        .0        UCit+ H3EDTA-
1  .0        .0        .0        .0        UCit+ H2EDTA=
1  .0        .0        .0        .0        UCit+ HEDTA--
1  .0        .0        .0        .0        UCit+ EDTA===
1  .0        .0        .0        .0        UCit+ AmEDTA==
1  .0        .0        .0        .0        UCit+ NpO2Cit=
1  .0        .0        .0        .0        UCit+ NpO2EDTA---
1  .0        .0        .0        .0        UCit+ NpO2Ox-
1  .0        .0        .0        .0        UCit+ U(OH)4(CO3)2==
1  .0        .0        .0        .0        UCit+ U(CO3)5===
1  .0        .0        .0        .0        UCit+ U(SO4)3-
1  .0        .0        .0        .0        UCit+ Pu(CO3)2-
1  .0        .0        .0        .0        UCit+ Pu(CO3)3=-
1  .0        .0        .0        .0        UCit+ PuEDTA-
1  .0        .0        .0        .0        UCit+ CaCit-
1  .0        .0        .0        .0        UCit+ CaEDTA=
1  .0        .0        .0        .0        UCit+ UnuAn#2-
1  .0        .0        .0        .0        UCit+ UnuAn#3-
1  .0        .0        .0        .0        UCit+ UnuAn#4-
1  .0        .0        .0        .0        UCit+ U(OH)2(CO3)2=
```

```
1  .0       .0       .0       .0       UCit+ MgCit-
1  .0       .0       .0       .0       UCit+ MgEDTA=
1  .0       .0       .0       .0       UCit+ UnuAn#1-

1  .2139    5.371    .0       .0       ULac+++ Cl-
3  .0       .0       .0       .0       ULac+++ SO4=
1  .0       .0       .0       .0       ULac+++ HSO4-
1  .0       .0       .0       .0       ULac+++ OH-
1  .0       .0       .0       .0       ULac+++ HCO3-
3  .0       .0       .0       .0       ULac+++ CO3=
1  .0       .0       .0       .0       ULac+++ B(OH)4-
1  .0       .0       .0       .0       ULac+++ B3O3(OH)4-
3  .0       .0       .0       .0       ULac+++ B4O5(OH)4=
1  .0       .0       .0       .0       ULac+++ Br-
1  .0       .0       .0       .0       ULac+++ Am(CO3)2-
3  .0       .0       .0       .0       ULac+++ Am(CO3)3=-
1  .0       .0       .0       .0       ULac+++ ClO4-
1  .0       .0       .0       .0       ULac+++ NpO2(OH)2-
1  .0       .0       .0       .0       ULac+++ NpO2CO3=
3  .0       .0       .0       .0       ULac+++ NpO2(CO3)2--
3  .0       .0       .0       .0       ULac+++ NpO2(CO3)3==-
1  .0       .0       .0       .0       ULac+++ H2PO4-
3  .0       .0       .0       .0       ULac+++ HPO4=
3  .0       .0       .0       .0       ULac+++ PO4---
3  .0       .0       .0       .0       ULac+++ Th(SO4)3=
1  .0       .0       .0       .0       ULac+++ Th(OH)3(CO3)-
3  .0       .0       .0       .0       ULac+++ Th(CO3)5===
1  .0       .0       .0       .0       ULac+++ HOx-
3  .0       .0       .0       .0       ULac+++ Ox=
1  .0       .0       .0       .0       ULac+++ Ac-
1  .0       .0       .0       .0       ULac+++ Lac-
1  .0       .0       .0       .0       ULac+++ H2Cit-
3  .0       .0       .0       .0       ULac+++ HCit=
3  .0       .0       .0       .0       ULac+++ Cit---
3  .0       .0       .0       .0       ULac+++ H3EDTA-
3  .0       .0       .0       .0       ULac+++ H2EDTA=
3  .0       .0       .0       .0       ULac+++ HEDTA---
3  .0       .0       .0       .0       ULac+++ EDTA----
3  .0       .0       .0       .0       ULac+++ AmEDTA=-
3  .0       .0       .0       .0       ULac+++ NpO2Cit=
3  .0       .0       .0       .0       ULac+++ NpO2EDTA==-
1  .0       .0       .0       .0       ULac+++ NpO2Ox-
3  .0       .0       .0       .0       ULac+++ U(OH)4(CO3)2==
3  .0       .0       .0       .0       ULac+++ U(CO3)5===
3  .0       .0       .0       .0       ULac+++ U(SO4)3=
1  .0       .0       .0       .0       ULac+++ Pu(CO3)2-
3  .0       .0       .0       .0       ULac+++ Pu(CO3)3=-
1  .0       .0       .0       .0       ULac+++ PuEDTA-
1  .0       .0       .0       .0       ULac+++ CaCit-
3  .0       .0       .0       .0       ULac+++ CaEDTA=
3  .0       .0       .0       .0       ULac+++ UnuAn#2-
1  .0       .0       .0       .0       ULac+++ UnuAn#3-
3  .0       .0       .0       .0       ULac+++ UnuAn#4-
3  .0       .0       .0       .0       ULac+++ U(OH)2(CO3)3=
1  .0       .0       .0       .0       ULac+++ MgCit-
3  .0       .0       .0       .0       ULac+++ MgEDTA=
1  .0       .0       .0       .0       ULac+++ UnuAn#1-

1 -.2061   -.525     .0       .0       UOx++ Cl-
2  .0       .0       .0       .0       UOx++ SO4=
1  .0       .0       .0       .0       UOx++ HSO4-
1  .0       .0       .0       .0       UOx++ OH-
1  .0       .0       .0       .0       UOx++ HCO3-
2  .0       .0       .0       .0       UOx++ CO3=
1  .0       .0       .0       .0       UOx++ B(OH)4-
1  .0       .0       .0       .0       UOx++ B3O3(OH)4-
2  .0       .0       .0       .0       UOx++ B4O5(OH)4=
1  .0       .0       .0       .0       UOx++ Br-
1  .0       .0       .0       .0       UOx++ Am(CO3)2-
3  .0       .0       .0       .0       UOx++ Am(CO3)3=-
1  .0       .0       .0       .0       UOx++ ClO4-
1  .0       .0       .0       .0       UOx++ NpO2(OH)2-
1  .0       .0       .0       .0       UOx++ NpO2CO3-
3  .0       .0       .0       .0       UOx++ NpO2(CO3)2=-
3  .0       .0       .0       .0       UOx++ NpO2(CO3)3==-
1  .0       .0       .0       .0       UOx++ H2PO4-
2  .0       .0       .0       .0       UOx++ HPO4=
3  .0       .0       .0       .0       UOx++ PO4---
2  .0       .0       .0       .0       UOx++ Th(SO4)3=
1  .0       .0       .0       .0       UOx++ Th(OH)3(CO3)-
3  .0       .0       .0       .0       UOx++ Th(CO3)5===
1  .0       .0       .0       .0       UOx++ HOx-
2  .0       .0       .0       .0       UOx++ Ox=
1  .0       .0       .0       .0       UOx++ Ac-
1  .0       .0       .0       .0       UOx++ Lac-
1  .0       .0       .0       .0       UOx++ H2Cit-
2  .0       .0       .0       .0       UOx++ HCit=
3  .0       .0       .0       .0       UOx++ Cit---
3  .0       .0       .0       .0       UOx++ H3EDTA-
3  .0       .0       .0       .0       UOx++ H2EDTA=
3  .0       .0       .0       .0       UOx++ HEDTA---
3  .0       .0       .0       .0       UOx++ EDTA----
3  .0       .0       .0       .0       UOx++ AmEDTA=-
3  .0       .0       .0       .0       UOx++ NpO2Cit=
3  .0       .0       .0       .0       UOx++ NpO2EDTA==-
1  .0       .0       .0       .0       UOx++ NpO2Ox-
3  .0       .0       .0       .0       UOx++ U(OH)4(CO3)2==
3  .0       .0       .0       .0       UOx++ U(CO3)5===
2  .0       .0       .0       .0       UOx++ U(SO4)3=
1  .0       .0       .0       .0       UOx++ Pu(CO3)2-
2  .0       .0       .0       .0       UOx++ Pu(CO3)3=-
1  .0       .0       .0       .0       UOx++ PuEDTA-
1  .0       .0       .0       .0       UOx++ CaCit-
2  .0       .0       .0       .0       UOx++ CaEDTA=
3  .0       .0       .0       .0       UOx++ UnuAn#2-
1  .0       .0       .0       .0       UOx++ UnuAn#3-
2  .0       .0       .0       .0       UOx++ UnuAn#4-
2  .0       .0       .0       .0       UOx++ U(OH)2(CO3)2=
1  .0       .0       .0       .0       UOx++ MgCit-
2  .0       .0       .0       .0       UOx++ MgEDTA=
1  .0       .0       .0       .0       UOx++ UnuAn#1-

1  1.239    4.934    .0       .0       ThAc+++ Cl-              RCM96
3  .0       .0       .0       .0       ThAc+++ SO4=
1  .0       .0       .0       .0       ThAc+++ HSO4-
1  .0       .0       .0       .0       ThAc+++ OH-
1  .0       .0       .0       .0       ThAc+++ HCO3-
3  .0       .0       .0       .0       ThAc+++ CO3=
1  .0       .0       .0       .0       ThAc+++ B(OH)4-
1  .0       .0       .0       .0       ThAc+++ B3O3(OH)4-
3  .0       .0       .0       .0       ThAc+++ B4O5(OH)4=
1  .0       .0       .0       .0       ThAc+++ Br-
1  .0       .0       .0       .0       ThAc+++ Am(CO3)2-
3  .0       .0       .0       .0       ThAc+++ Am(CO3)3=-
1  .0       .0       .0       .0       ThAc+++ ClO4-
1  .0       .0       .0       .0       ThAc+++ NpO2(OH)2-
1  .0       .0       .0       .0       ThAc+++ NpO2CO3-
3  .0       .0       .0       .0       ThAc+++ NpO2(CO3)2=-
3  .0       .0       .0       .0       ThAc+++ NpO2(CO3)3==-
1  .0       .0       .0       .0       ThAc+++ H2PO4-
3  .0       .0       .0       .0       ThAc+++ HPO4=
3  .0       .0       .0       .0       ThAc+++ PO4---
3  .0       .0       .0       .0       ThAc+++ Th(SO4)3=
1  .0       .0       .0       .0       ThAc+++ Th(OH)3(CO3)-
3  .0       .0       .0       .0       ThAc+++ Th(CO3)5===
1  .0       .0       .0       .0       ThAc+++ HOx-
3  .0       .0       .0       .0       ThAc+++ Ox=
1  .0       .0       .0       .0       ThAc+++ Ac-
1  .0       .0       .0       .0       ThAc+++ Lac-
1  .0       .0       .0       .0       ThAc+++ H2Cit-
```

```
3  .0        .0        .0        .0        ThAc+++ HCit=
2  .0        .0        .0        .0        ThAc+++ Cit--
3  .0        .0        .0        .0        ThAc+++ H3EDTA-
3  .0        .0        .0        .0        ThAc+++ H2EDTA=
3  .0        .0        .0        .0        ThAc+++ HEDTA--
3  .0        .0        .0        .0        ThAc+++ EDTA---
3  .0        .0        .0        .0        ThAc+++ AmEDTA--
3  .0        .0        .0        .0        ThAc+++ NpO2Cit-
3  .0        .0        .0        .0        ThAc+++ NpO2EDTA---
1  .0        .0        .0        .0        ThAc+++ NpO2ox-
3  .0        .0        .0        .0        ThAc+++ U(OH)4(CO3)2--
3  .0        .0        .0        .0        ThAc+++ U(CO3)5----
3  .0        .0        .0        .0        ThAc+++ U(SO4)3=
1  .0        .0        .0        .0        ThAc+++ Pu(CO3)2-
3  .0        .0        .0        .0        ThAc+++ Pu(CO3)3=-
1  .0        .0        .0        .0        ThAc+++ PuEDTA-
1  .0        .0        .0        .0        ThAc+++ CaCit-
3  .0        .0        .0        .0        ThAc+++ CaEDTA=
3  .0        .0        .0        .0        ThAc+++ UnuAn#2-
1  .0        .0        .0        .0        ThAc+++ UnuAn#3-
3  .0        .0        .0        .0        ThAc+++ UnuAn#4-
3  .0        .0        .0        .0        ThAc+++ U(OH)2[CO3]2-
1  .0        .0        .0        .0        ThAc+++ MgCit-
3  .0        .0        .0        .0        ThAc+++ MgEDTA=
1  .0        .0        .0        .0        ThAc+++ UnuAn#1-

1  -.604     -1.607    .0        .0        ThCit+ Cl-          KCM9A
1  .0        .0        .0        .0        ThCit+ SO4=
1  .0        .0        .0        .0        ThCit+ HSO4-
1  .0        .0        .0        .0        ThCit+ OH-
1  .0        .0        .0        .0        ThCit+ HCO3-
1  .0        .0        .0        .0        ThCit+ CO3=
1  .0        .0        .0        .0        ThCit+ B(OH)4-
1  .0        .0        .0        .0        ThCit+ B3O3(OH)4-
1  .0        .0        .0        .0        ThCit+ B4O5(OH)4=
1  .0        .0        .0        .0        ThCit+ Br-
1  .0        .0        .0        .0        ThCit+ Am(CO3)2-
1  .0        .0        .0        .0        ThCit+ Am(CO3)3=-
1  .0        .0        .0        .0        ThCit+ ClO4-
1  .0        .0        .0        .0        ThCit+ NpO2(OH)2-
1  .0        .0        .0        .0        ThCit+ NpO2CO3-
1  .0        .0        .0        .0        ThCit+ NpO2(CO3)2--
1  .0        .0        .0        .0        ThCit+ NpO2(CO3)3=--
1  .0        .0        .0        .0        ThCit+ H2PO4-
1  .0        .0        .0        .0        ThCit+ HPO4=
1  .0        .0        .0        .0        ThCit+ PO4---
1  .0        .0        .0        .0        ThCit+ Th(SO4)3=
1  .0        .0        .0        .0        ThCit+ Th(OH)3(CO3)-
1  .0        .0        .0        .0        ThCit+ Th(CO3)5----
1  .0        .0        .0        .0        ThCit+ HOx-
1  .0        .0        .0        .0        ThCit+ Ox-
1  .0        .0        .0        .0        ThCit+ Ac-
1  .0        .0        .0        .0        ThCit+ Lac-
1  .0        .0        .0        .0        ThCit+ H2Cit-
1  .0        .0        .0        .0        ThCit+ HCit=
1  .0        .0        .0        .0        ThCit+ Cit---
1  .0        .0        .0        .0        ThCit+ H3EDTA-
1  .0        .0        .0        .0        ThCit+ H2EDTA=
1  .0        .0        .0        .0        ThCit+ HEDTA--
1  .0        .0        .0        .0        ThCit+ EDTA----
1  .0        .0        .0        .0        ThCit+ AmEDTA--
1  .0        .0        .0        .0        ThCit+ NpO2Cit=
1  .0        .0        .0        .0        ThCit+ NpO2EDTA---
1  .0        .0        .0        .0        ThCit+ NpO2ox-
1  .0        .0        .0        .0        ThCit+ U(OH)4(CO3)2--
1  .0        .0        .0        .0        ThCit+ U(CO3)5----
1  .0        .0        .0        .0        ThCit+ U(SO4)3=
1  .0        .0        .0        .0        ThCit+ Pu(CO3)2-
1  .0        .0        .0        .0        ThCit+ Pu(CO3)3=-
1  .0        .0        .0        .0        ThCit+ PuEDTA-
1  .0        .0        .0        .0        ThCit+ CaCit-
1  .0        .0        .0        .0        ThCit+ CaEDTA=
1  .0        .0        .0        .0        ThCit+ UnuAn#2-
1  .0        .0        .0        .0        ThCit+ UnuAn#3-
1  .0        .0        .0        .0        ThCit+ UnuAn#4-
1  .0        .0        .0        .0        ThCit+ U(OH)2[CO3]2-
1  .0        .0        .0        .0        ThCit+ MgCit-
1  .0        .0        .0        .0        ThCit+ MgEDTA=
1  .0        .0        .0        .0        ThCit+ UnuAn#1-

1  .2138     5.371     .0        .0        ThLac+++ Cl-        KCM9A
3  .0        .0        .0        .0        ThLac+++ SO4=
1  .0        .0        .0        .0        ThLac+++ HSO4-
1  .0        .0        .0        .0        ThLac+++ OH-
1  .0        .0        .0        .0        ThLac+++ HCO3-
3  .0        .0        .0        .0        ThLac+++ CO3=
1  .0        .0        .0        .0        ThLac+++ B(OH)4-
1  .0        .0        .0        .0        ThLac+++ B3O3(OH)4-
3  .0        .0        .0        .0        ThLac+++ B4O5(OH)4=
1  .0        .0        .0        .0        ThLac+++ Br-
1  .0        .0        .0        .0        ThLac+++ Am(CO3)2-
3  .0        .0        .0        .0        ThLac+++ Am(CO3)3=-
1  .0        .0        .0        .0        ThLac+++ ClO4-
1  .0        .0        .0        .0        ThLac+++ NpO2(OH)2-
1  .0        .0        .0        .0        ThLac+++ NpO2CO3-
3  .0        .0        .0        .0        ThLac+++ NpO2(CO3)2--
3  .0        .0        .0        .0        ThLac+++ NpO2(CO3)3=--
1  .0        .0        .0        .0        ThLac+++ H2PO4-
3  .0        .0        .0        .0        ThLac+++ HPO4=
3  .0        .0        .0        .0        ThLac+++ PO4---
3  .0        .0        .0        .0        ThLac+++ Th(SO4)3=
1  .0        .0        .0        .0        ThLac+++ Th(OH)3(CO3)-
3  .0        .0        .0        .0        ThLac+++ Th(CO3)5----
1  .0        .0        .0        .0        ThLac+++ HOx-
3  .0        .0        .0        .0        ThLac+++ Ox-
1  .0        .0        .0        .0        ThLac+++ Ac-
1  .0        .0        .0        .0        ThLac+++ Lac-
1  .0        .0        .0        .0        ThLac+++ H2Cit-
3  .0        .0        .0        .0        ThLac+++ HCit=
3  .0        .0        .0        .0        ThLac+++ Cit---
3  .0        .0        .0        .0        ThLac+++ H3EDTA-
3  .0        .0        .0        .0        ThLac+++ H2EDTA=
3  .0        .0        .0        .0        ThLac+++ HEDTA--
3  .0        .0        .0        .0        ThLac+++ EDTA----
3  .0        .0        .0        .0        ThLac+++ AmEDTA--
3  .0        .0        .0        .0        ThLac+++ NpO2Cit=
3  .0        .0        .0        .0        ThLac+++ NpO2EDTA---
1  .0        .0        .0        .0        ThLac+++ NpO2ox-
3  .0        .0        .0        .0        ThLac+++ U(OH)4(CO3)2--
3  .0        .0        .0        .0        ThLac+++ U(CO3)5----
3  .0        .0        .0        .0        ThLac+++ U(SO4)3=
1  .0        .0        .0        .0        ThLac+++ Pu(CO3)2-
3  .0        .0        .0        .0        ThLac+++ Pu(CO3)3=-
1  .0        .0        .0        .0        ThLac+++ PuEDTA-
1  .0        .0        .0        .0        ThLac+++ CaCit-
3  .0        .0        .0        .0        ThLac+++ CaEDTA=
3  .0        .0        .0        .0        ThLac+++ UnuAn#2-
1  .0        .0        .0        .0        ThLac+++ UnuAn#3-
3  .0        .0        .0        .0        ThLac+++ UnuAn#4-
3  .0        .0        .0        .0        ThLac+++ U(OH)2(CO3)2-
1  .0        .0        .0        .0        ThLac+++ MgCit-
3  .0        .0        .0        .0        ThLac+++ MgEDTA=
1  .0        .0        .0        .0        ThLac+++ UnuAn#1-

1  -0.6      3.0       .0        0.2       AmOH++ Cl-    FKPKH94
2  .0        .0        .0        .0        AmOH++ SO4=
1  .0        .0        .0        .0        AmOH++ HSO4-
1  .0        .0        .0        .0        AmOH++ OH-
1  .0        .0        .0        .0        AmOH++ HCO3-
2  .0        .0        .0        .0        AmOH++ CO3=
```

```
1  .0       .0       .0       .0       AmOH++ B(OH)4-
1  .0       .0       .0       .0       AmOH++ B3O3(OH)4-
2  .0       .0       .0       .0       AmOH++ B4O5(OH)4=
1  .0       .0       .0       .0       AmOH++ Br-
1  .0       .0       .0       .0       AmOH++ Am(CO3)2-
3  .0       .0       .0       .0       AmOH++ Am(CO3)3=-
1  .0       .0       .0       .0       AmOH++ ClO4-
1  .0       .0       .0       .0       AmOH++ NpO2(OH)2-
1  .0       .0       .0       .0       AmOH++ NpO2CO3-
3  .0       .0       .0       .0       AmOH++ NpO2(CO3)2=-
3  .0       .0       .0       .0       AmOH++ NpO2(CO3)3=-=
1  .0       .0       .0       .0       AmOH++ H2PO4-
2  .0       .0       .0       .0       AmOH++ HPO4=
3  .0       .0       .0       .0       AmOH++ PO4=-
2  .0       .0       .0       .0       AmOH++ Th(SO4)3=
1  .0       .0       .0       .0       AmOH++ Th(OH)3(CO3)-
3  .0       .0       .0       .0       AmOH++ Th(CO3)5===
1  .0       .0       .0       .0       AmOH++ HOx-
2  .0       .0       .0       .0       AmOH++ Ox=
1  .0       .0       .0       .0       AmOH++ Ac-
1  .0       .0       .0       .0       AmOH++ Lac-
1  .0       .0       .0       .0       AmOH++ H2Cit-
2  .0       .0       .0       .0       AmOH++ HCit=
3  .0       .0       .0       .0       AmOH++ Cit=-
3  .0       .0       .0       .0       AmOH++ H3EDTA-
3  .0       .0       .0       .0       AmOH++ H2EDTA=
3  .0       .0       .0       .0       AmOH++ HEDTA--
3  .0       .0       .0       .0       AmOH++ EDTA==
3  .0       .0       .0       .0       AmOH++ AmEDTA=-
3  .0       .0       .0       .0       AmOH++ NpO2Cit=
3  .0       .0       .0       .0       AmOH++ NpO2EDTA---
1  .0       .0       .0       .0       AmOH++ NpO2Ox-
3  .0       .0       .0       .0       AmOH++ U(OH)4(CO3)2=-
3  .0       .0       .0       .0       AmOH++ U(CO3)5===
2  .0       .0       .0       .0       AmOH++ U(SO4)3-
1  .0       .0       .0       .0       AmOH++ Pu(CO3)2-
2  .0       .0       .0       .0       AmOH++ Pu(CO3)3=-
1  .0       .0       .0       .0       AmOH++ PuEDTA-
1  .0       .0       .0       .0       AmOH++ CaCit-
2  .0       .0       .0       .0       AmOH++ CaEDTA=
3  .0       .0       .0       .0       AmOH++ UnuAn#2-
1  .0       .0       .0       .0       AmOH++ UnuAn#3-
2  .0       .0       .0       .0       AmOH++ UnuAn#4-
2  .0       .0       .0       .0       AmOH++ U(OH)2(CO3)2=
1  .0       .0       .0       .0       AmOH++ MgCit-
2  .0       .0       .0       .0       AmOH++ MgEDTA=
1  .0       .0       .0       .0       AmOH++ UnuAn#1-

1 -0.58     -0.9     .0       .0       Am(OH)2+ Cl-    FKPKH94
1  .0       .0       .0       .0       Am(OH)2+ SO4=
1  .0       .0       .0       .0       Am(OH)2+ HSO4-
1  .0       .0       .0       .0       Am(OH)2+ OH-
1  .0       .0       .0       .0       Am(OH)2+ HCO3-
1  .0       .0       .0       .0       Am(OH)2+ CO3=
1  .0       .0       .0       .0       Am(OH)2+ B(OH)4-
1  .0       .0       .0       .0       Am(OH)2+ B3O3(OH)4-
1  .0       .0       .0       .0       Am(OH)2+ B4O5(OH)4=
1  .0       .0       .0       .0       Am(OH)2+ Br-
1  .0       .0       .0       .0       Am(OH)2+ Am(CO3)2-
1  .0       .0       .0       .0       Am(OH)2+ Am(CO3)3=-
1  .0       .0       .0       .0       Am(OH)2+ ClO4-
1  .0       .0       .0       .0       Am(OH)2+ NpO2(OH)2-
1  .0       .0       .0       .0       Am(OH)2+ NpO2CO3-
1  .0       .0       .0       .0       Am(OH)2+ NpO2(CO3)2=-
1  .0       .0       .0       .0       Am(OH)2+ NpO2(CO3)3=-=
1  .0       .0       .0       .0       Am(OH)2+ H2PO4-
1  .0       .0       .0       .0       Am(OH)2+ HPO4=
1  .0       .0       .0       .0       Am(OH)2+ PO4=-
1  .0       .0       .0       .0       Am(OH)2+ Th(SO4)3=
1  .0       .0       .0       .0       Am(OH)2+ Th(OH)3(CO3)-
1  .0       .0       .0       .0       Am(OH)2+ Th(CO3)5===
1  .0       .0       .0       .0       Am(OH)2+ HOx-
1  .0       .0       .0       .0       Am(OH)2+ Ox=
1  .0       .0       .0       .0       Am(OH)2+ Ac-
1  .0       .0       .0       .0       Am(OH)2+ Lac-
1  .0       .0       .0       .0       Am(OH)2+ H2Cit-
1  .0       .0       .0       .0       Am(OH)2+ HCit=
1  .0       .0       .0       .0       Am(OH)2+ Cit=-
1  .0       .0       .0       .0       Am(OH)2+ H3EDTA-
1  .0       .0       .0       .0       Am(OH)2+ H2EDTA=
1  .0       .0       .0       .0       Am(OH)2+ HEDTA--
1  .0       .0       .0       .0       Am(OH)2+ EDTA==
1  .0       .0       .0       .0       Am(OH)2+ AmEDTA=-
1  .0       .0       .0       .0       Am(OH)2+ NpO2Cit=
1  .0       .0       .0       .0       Am(OH)2+ NpO2EDTA---
1  .0       .0       .0       .0       Am(OH)2+ NpO2Ox-
1  .0       .0       .0       .0       Am(OH)2+ U(OH)4(CO3)2=-
1  .0       .0       .0       .0       Am(OH)2+ U(CO3)5===
1  .0       .0       .0       .0       Am(OH)2+ U(SO4)3=
1  .0       .0       .0       .0       Am(OH)2+ Pu(CO3)2-
1  .0       .0       .0       .0       Am(OH)2+ Pu(CO3)3=-
1  .0       .0       .0       .0       Am(OH)2+ PuEDTA-
1  .0       .0       .0       .0       Am(OH)2+ CaCit-
1  .0       .0       .0       .0       Am(OH)2+ CaEDTA=
1  .0       .0       .0       .0       Am(OH)2+ UnuAn#2-
1  .0       .0       .0       .0       Am(OH)2+ UnuAn#3-
1  .0       .0       .0       .0       Am(OH)2+ UnuAn#4-
1  .0       .0       .0       .0       Am(OH)2+ U(OH)2(CO3)2=
1  .0       .0       .0       .0       Am(OH)2+ MgCit-
1  .0       .0       .0       .0       Am(OH)2+ MgEDTA=
1  .0       .0       .0       .0       Am(OH)2+ UnuAn#1-

1  .0       .0       .0       .0       PuCO3+ Cl-
1  .0       .0       .0       .0       PuCO3+ SO4=
1  .0       .0       .0       .0       PuCO3+ HSO4-
1  .0       .0       .0       .0       PuCO3+ OH-
1  .0       .0       .0       .0       PuCO3+ HCO3-
1  .0       .0       .0       .0       PuCO3+ CO3=
1  .0       .0       .0       .0       PuCO3+ B(OH)4-
1  .0       .0       .0       .0       PuCO3+ B3O3(OH)4-
1  .0       .0       .0       .0       PuCO3+ B4O5(OH)4=
1  .0       .0       .0       .0       PuCO3+ Br-
1  .0       .0       .0       .0       PuCO3+ Am(CO3)2-
1  .0       .0       .0       .0       PuCO3+ Am(CO3)3=-
1  .0       .0       .0       .0       PuCO3+ ClO4-
1  .0       .0       .0       .0       PuCO3+ NpO2(OH)2-
1  .0       .0       .0       .0       PuCO3+ NpO2CO3-
1  .0       .0       .0       .0       PuCO3+ NpO2(CO3)2=-
1  .0       .0       .0       .0       PuCO3+ NpO2(CO3)3=-=
1  .0       .0       .0       .0       PuCO3+ H2PO4-
1  .0       .0       .0       .0       PuCO3+ HPO4=
1  .0       .0       .0       .0       PuCO3+ PO4=-
1  .0       .0       .0       .0       PuCO3+ Th(SO4)3=
1  .0       .0       .0       .0       PuCO3+ Th(OH)3(CO3)-
1  .0       .0       .0       .0       PuCO3+ Th(CO3)5===
1  .0       .0       .0       .0       PuCO3+ HOx-
1  .0       .0       .0       .0       PuCO3+ Ox=
1  .0       .0       .0       .0       PuCO3+ Ac-
1  .0       .0       .0       .0       PuCO3+ Lac-
1  .0       .0       .0       .0       PuCO3+ H2Cit-
1  .0       .0       .0       .0       PuCO3+ HCit=
1  .0       .0       .0       .0       PuCO3+ Cit=-
1  .0       .0       .0       .0       PuCO3+ H3EDTA-
1  .0       .0       .0       .0       PuCO3+ H2EDTA=
1  .0       .0       .0       .0       PuCO3+ HEDTA--
1  .0       .0       .0       .0       PuCO3+ EDTA==
1  .0       .0       .0       .0       PuCO3+ AmEDTA=-
1  .0       .0       .0       .0       PuCO3+ NpO2Cit=
1  .0       .0       .0       .0       PuCO3+ NpO2EDTA---
1  .0       .0       .0       .0       PuCO3+ NpO2Ox-
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1  .0       .0       .0       .0       PuCO3+ U(OH)4(CO3)2--
1  .0       .0       .0       .0       PuCO3+ U(CO3)5---
1  .0       .0       .0       .0       PuCO3+ U(SO4)3=
1  .0       .0       .0       .0       PuCO3+ Pu(CO3)2-
1  .0       .0       .0       .0       PuCO3+ Pu(CO3)3--
1  .0       .0       .0       .0       PuCO3+ PuEDTA-
1  .0       .0       .0       .0       PuCO3+ CaCit-
1  .0       .0       .0       .0       PuCO3+ CaEDTA=
1  .0       .0       .0       .0       PuCO3+ UnuAn#2-
1  .0       .0       .0       .0       PuCO3+ UnuAn#3-
1  .0       .0       .0       .0       PuCO3+ UnuAn#4-
1  .0       .0       .0       .0       PuCO3+ U(OH)2(CO3)2=
1  .0       .0       .0       .0       PuCO3+ MgCit-
1  .0       .0       .0       .0       PuCO3+ MgEDTA=
1  .0       .0       .0       .0       PuCO3+ UnuAn#1-

1 -0.6     3.0      .0       0.2      PuOH++ Cl-    Analogy w/Am(III)
0  .0       .0       .0       .0       PuOH++ SO4=
1  .0       .0       .0       .0       PuOH++ HSO4-
1  .0       .0       .0       .0       PuOH++ OH-
1  .0       .0       .0       .0       PuOH++ HCO3-
2  .0       .0       .0       .0       PuOH++ CO3=
1  .0       .0       .0       .0       PuOH++ B(OH)4-
1  .0       .0       .0       .0       PuOH++ B3O3(OH)4-
2  .0       .0       .0       .0       PuOH++ B4O5(OH)4=
1  .0       .0       .0       .0       PuOH++ Br-
1  .0       .0       .0       .0       PuOH++ Am(CO3)2-
3  .0       .0       .0       .0       PuOH++ Am(CO3)3=-
1  .0       .0       .0       .0       PuOH++ ClO4-
1  .0       .0       .0       .0       PuOH++ NpO2(OH)2-
1  .0       .0       .0       .0       PuOH++ NpO2CO3-
0  .0       .0       .0       .0       PuOH++ NpO2(CO3)2=-
3  .0       .0       .0       .0       PuOH++ NpO2(CO3)3---
1  .0       .0       .0       .0       PuOH++ H2PO4-
2  .0       .0       .0       .0       PuOH++ HPO4=
3  .0       .0       .0       .0       PuOH++ PO4---
2  .0       .0       .0       .0       PuOH++ Th(SO4)3-
1  .0       .0       .0       .0       PuOH++ Th(OH)3(CO3)-
3  .0       .0       .0       .0       PuOH++ Th(CO3)5---
1  .0       .0       .0       .0       PuOH++ HOx-
2  .0       .0       .0       .0       PuOH++ Ox=
1  .0       .0       .0       .0       PuOH++ Ac-
1  .0       .0       .0       .0       PuOH++ Lac-
1  .0       .0       .0       .0       PuOH++ H2Cit-
2  .0       .0       .0       .0       PuOH++ HCit=
3  .0       .0       .0       .0       PuOH++ Cit---
3  .0       .0       .0       .0       PuOH++ H3EDTA-
2  .0       .0       .0       .0       PuOH++ H2EDTA=
3  .0       .0       .0       .0       PuOH++ HEDTA---
3  .0       .0       .0       .0       PuOH++ EDTA----
3  .0       .0       .0       .0       PuOH++ AmEDTA=-
2  .0       .0       .0       .0       PuOH++ NpO2Cit=
3  .0       .0       .0       .0       PuOH++ NpO2EDTA----
1  .0       .0       .0       .0       PuOH++ NpO2ox-
3  .0       .0       .0       .0       PuOH++ U(OH)4(CO3)2--
3  .0       .0       .0       .0       PuOH++ U(CO3)5---=
2  .0       .0       .0       .0       PuOH++ U(SO4)3=
1  .0       .0       .0       .0       PuOH++ Pu(CO3)2-
3  .0       .0       .0       .0       PuOH++ Pu(CO3)3--
1  .0       .0       .0       .0       PuOH++ PuEDTA-
1  .0       .0       .0       .0       PuOH++ CaCit-
2  .0       .0       .0       .0       PuOH++ CaEDTA=
1  .0       .0       .0       .0       PuOH++ UnuAn#2-
1  .0       .0       .0       .0       PuOH++ UnuAn#3-
1  .0       .0       .0       .0       PuOH++ UnuAn#4-
1  .0       .0       .0       .0       PuOH++ U(OH)2(CO3)2=
1  .0       .0       .0       .0       PuOH++ MgCit-
2  .0       .0       .0       .0       PuOH++ MgEDTA=
1  .0       .0       .0       .0       PuOH++ UnuAn#1-

1 -0.56    -0.9      .0       .0       Pu(OH)2+ Cl-    Analogy w/Am(III)
1  .0       .0       .0       .0       Pu(OH)2+ SO4=
1  .0       .0       .0       .0       Pu(OH)2+ HSO4-
1  .0       .0       .0       .0       Pu(OH)2+ OH-
1  .0       .0       .0       .0       Pu(OH)2+ HCO3-
1  .0       .0       .0       .0       Pu(OH)2+ CO3=
1  .0       .0       .0       .0       Pu(OH)2+ B(OH)4-
1  .0       .0       .0       .0       Pu(OH)2+ B3O3(OH)4-
1  .0       .0       .0       .0       Pu(OH)2+ B4O5(OH)4=
1  .0       .0       .0       .0       Pu(OH)2+ Br-
1  .0       .0       .0       .0       Pu(OH)2+ Am(CO3)2-
1  .0       .0       .0       .0       Pu(OH)2+ Am(CO3)3=-
1  .0       .0       .0       .0       Pu(OH)2+ ClO4-
1  .0       .0       .0       .0       Pu(OH)2+ NpO2(OH)2-
1  .0       .0       .0       .0       Pu(OH)2+ NpO2CO3-
1  .0       .0       .0       .0       Pu(OH)2+ NpO2(CO3)2=-
1  .0       .0       .0       .0       Pu(OH)2+ NpO2(CO3)3=--
1  .0       .0       .0       .0       Pu(OH)2+ H2PO4-
1  .0       .0       .0       .0       Pu(OH)2+ HPO4=
1  .0       .0       .0       .0       Pu(OH)2+ PO4=-
1  .0       .0       .0       .0       Pu(OH)2+ Th(SO4)3=
1  .0       .0       .0       .0       Pu(OH)2+ Th(OH)3(CO3)-
1  .0       .0       .0       .0       Pu(OH)2+ Th(CO3)5---
1  .0       .0       .0       .0       Pu(OH)2+ HOx-
1  .0       .0       .0       .0       Pu(OH)2+ Ox=
1  .0       .0       .0       .0       Pu(OH)2+ Ac-
1  .0       .0       .0       .0       Pu(OH)2+ Lac-
1  .0       .0       .0       .0       Pu(OH)2+ H2Cit-
1  .0       .0       .0       .0       Pu(OH)2+ HCit-
1  .0       .0       .0       .0       Pu(OH)2+ Cit---
1  .0       .0       .0       .0       Pu(OH)2+ H3EDTA-
1  .0       .0       .0       .0       Pu(OH)2+ H2EDTA=
1  .0       .0       .0       .0       Pu(OH)2+ HEDTA---
1  .0       .0       .0       .0       Pu(OH)2+ EDTA----
1  .0       .0       .0       .0       Pu(OH)2+ AmEDTA=-
1  .0       .0       .0       .0       Pu(OH)2+ NpO2Cit=
1  .0       .0       .0       .0       Pu(OH)2+ NpO2EDTA----
1  .0       .0       .0       .0       Pu(OH)2+ NpO2ox-
1  .0       .0       .0       .0       Pu(OH)2+ U(OH)4(CO3)2--
1  .0       .0       .0       .0       Pu(OH)2+ U(CO3)5---=
1  .0       .0       .0       .0       Pu(OH)2+ U(SO4)3=
1  .0       .0       .0       .0       Pu(OH)2+ Pu(CO3)2-
1  .0       .0       .0       .0       Pu(OH)2+ Pu(CO3)3=-
1  .0       .0       .0       .0       Pu(OH)2+ PuEDTA-
1  .0       .0       .0       .0       Pu(OH)2+ CaCit-
1  .0       .0       .0       .0       Pu(OH)2+ CaEDTA=
1  .0       .0       .0       .0       Pu(OH)2+ UnuAn#2-
1  .0       .0       .0       .0       Pu(OH)2+ UnuAn#3-
1  .0       .0       .0       .0       Pu(OH)2+ UnuAn#4-
1  .0       .0       .0       .0       Pu(OH)2+ U(OH)2(CO3)2=
1  .0       .0       .0       .0       Pu(OH)2+ MgCit-
1  .0       .0       .0       .0       Pu(OH)2+ MgEDTA=
1  .0       .0       .0       .0       Pu(OH)2+ UnuAn#1-

1  .227     2.154    .0      -.102     PuAc++ Cl-          RCM96
2  .0       .0       .0       .0       PuAc++ SO4=
1  .0       .0       .0       .0       PuAc++ HSO4-
1  .0       .0       .0       .0       PuAc++ OH-
1  .0       .0       .0       .0       PuAc++ HCO3-
2  .0       .0       .0       .0       PuAc++ CO3=
1  .0       .0       .0       .0       PuAc++ B(OH)4-
1  .0       .0       .0       .0       PuAc++ B3O3(OH)4-
2  .0       .0       .0       .0       PuAc++ B4O5(OH)4=
1  .0       .0       .0       .0       PuAc++ Br-
1  .0       .0       .0       .0       PuAc++ Am(CO3)2-
3  .0       .0       .0       .0       PuAc++ Am(CO3)3=-
1  .0       .0       .0       .0       PuAc++ ClO4-
1  .0       .0       .0       .0       PuAc++ NpO2(OH)2-
1  .0       .0       .0       .0       PuAc++ NpO2CO3-
3  .0       .0       .0       .0       PuAc++ NpO2(CO3)2--
```

```
3  .0       .0       .0       .0       PuAc++ Np02(C03)3---
1  .0       .0       .0       .0       PuAc++ H2P04-
2  .0       .0       .0       .0       PuAc++ HP04=
3  .0       .0       .0       .0       PuAc++ P04---
2  .0       .0       .0       .0       PuAc++ Th(S04)3=
1  .0       .0       .0       .0       PuAc++ Th(OH)3(C03)-
3  .0       .0       .0       .0       PuAc++ Th(C03)5---
1  .0       .0       .0       .0       PuAc++ HOx-
2  .0       .0       .0       .0       PuAc++ Ox=
1  .0       .0       .0       .0       PuAc++ Ac-
1  .0       .0       .0       .0       PuAc++ Lac-
1  .0       .0       .0       .0       PuAc++ H2Cit-
2  .0       .0       .0       .0       PuAc++ HCit=
3  .0       .0       .0       .0       PuAc++ Cit---
3  .0       .0       .0       .0       PuAc++ H3EDTA-
3  .0       .0       .0       .0       PuAc++ H2EDTA=
3  .0       .0       .0       .0       PuAc++ HEDTA--
3  .0       .0       .0       .0       PuAc++ EDTA----
3  .0       .0       .0       .0       PuAc++ AmEDTA--
3  .0       .0       .0       .0       PuAc++ Np02Cit=
3  .0       .0       .0       .0       PuAc++ Np02EDTA----
1  .0       .0       .0       .0       PuAc++ Np02Ox-
3  .0       .0       .0       .0       PuAc++ U(OH)4(C03)2--
3  .0       .0       .0       .0       PuAc++ U(C03)5---
2  .0       .0       .0       .0       PuAc++ U(S04)3=
1  .0       .0       .0       .0       PuAc++ Pu(C03)2-
2  .0       .0       .0       .0       PuAc++ Pu(C03)3--
1  .0       .0       .0       .0       PuAc++ PuEDTA-
1  .0       .0       .0       .0       PuAc++ CaCit-
3  .0       .0       .0       .0       PuAc++ CaEDTA=
3  .0       .0       .0       .0       PuAc++ UnuAn02-
1  .0       .0       .0       .0       PuAc++ UnuAn03-
2  .0       .0       .0       .0       PuAc++ UnuAn04-
2  .0       .0       .0       .0       PuAc++ Ca(OH)2(C03)2=
1  .0       .0       .0       .0       PuAc++ MgCit-
2  .0       .0       .0       .0       PuAc++ MgEDTA=
1  .0       .0       .0       .0       PuAc++ UnuAn01-

1 -.3219    .0       .0       .0       PuOx+ Cl-            RCH96
1  .0       .0       .0       .0       PuOx+ S04=
1  .0       .0       .0       .0       PuOx+ HS04-
1  .0       .0       .0       .0       PuOx+ OH-
1  .0       .0       .0       .0       PuOx+ HC03-
1  .0       .0       .0       .0       PuOx+ C03=
1  .0       .0       .0       .0       PuOx+ B(OH)4-
1  .0       .0       .0       .0       PuOx+ B3O3(OH)4-
1  .0       .0       .0       .0       PuOx+ B4O5(OH)4=
1  .0       .0       .0       .0       PuOx+ Br-
1  .0       .0       .0       .0       PuOx+ Am(C03)2-
1  .0       .0       .0       .0       PuOx+ Am(C03)3=-
1  .0       .0       .0       .0       PuOx+ C104-
1  .0       .0       .0       .0       PuOx+ Np02(OH)2-
1  .0       .0       .0       .0       PuOx+ Np02C03=
1  .0       .0       .0       .0       PuOx+ Np02(C03)2==
1  .0       .0       .0       .0       PuOx+ Np02(C03)3===
1  .0       .0       .0       .0       PuOx+ H2P04-
1  .0       .0       .0       .0       PuOx+ HP04=
1  .0       .0       .0       .0       PuOx+ P04---
1  .0       .0       .0       .0       PuOx+ Th(S04)3=
1  .0       .0       .0       .0       PuOx+ Th(OH)3(C03)-
1  .0       .0       .0       .0       PuOx+ Th(C03)5---
1  .0       .0       .0       .0       PuOx+ HOx-
1  .0       .0       .0       .0       PuOx+ Ox=
1  .0       .0       .0       .0       PuOx+ Ac-
1  .0       .0       .0       .0       PuOx+ Lac-
1  .0       .0       .0       .0       PuOx+ H2Cit-
1  .0       .0       .0       .0       PuOx+ HCit=
1  .0       .0       .0       .0       PuOx+ Cit---
1  .0       .0       .0       .0       PuOx+ H3EDTA-
1  .0       .0       .0       .0       PuOx+ H2EDTA=
1  .0       .0       .0       .0       PuOx+ HEDTA--
1  .0       .0       .0       .0       PuOx+ EDTA----
1  .0       .0       .0       .0       PuOx+ AmEDTA--
1  .0       .0       .0       .0       PuOx+ Np02Cit=
1  .0       .0       .0       .0       PuOx+ Np02EDTA----
1  .0       .0       .0       .0       PuOx+ Np02Ox-
1  .0       .0       .0       .0       PuOx+ U(OH)4(C03)2--
1  .0       .0       .0       .0       PuOx+ U(C03)5---
1  .0       .0       .0       .0       PuOx+ U(S04)3=
1  .0       .0       .0       .0       PuOx+ Pu(C03)2-
1  .0       .0       .0       .0       PuOx+ Pu(C03)3--
1  .0       .0       .0       .0       PuOx+ PuEDTA-
1  .0       .0       .0       .0       PuOx+ CaCit-
1  .0       .0       .0       .0       PuOx+ CaEDTA=
1  .0       .0       .0       .0       PuOx+ UnuAn02-
1  .0       .0       .0       .0       PuOx+ UnuAn03-
1  .0       .0       .0       .0       PuOx+ UnuAn04-
1  .0       .0       .0       .0       PuOx+ U(OH)2(C03)2-
1  .0       .0       .0       .0       PuOx+ MgCit-
1  .0       .0       .0       .0       PuOx+ MgEDTA=
1  .0       .0       .0       .0       PuOx+ UnuAn01-

1 -.0572    6.331    .0       .0       PuLac++ Cl-          RCH96
1  .0       .0       .0       .0       PuLac++ S04-
1  .0       .0       .0       .0       PuLac++ HS04-
1  .0       .0       .0       .0       PuLac++ OH-
1  .0       .0       .0       .0       PuLac++ HC03-
1  .0       .0       .0       .0       PuLac++ C03=
1  .0       .0       .0       .0       PuLac++ B(OH)4-
1  .0       .0       .0       .0       PuLac++ B3O3(OH)4-
1  .0       .0       .0       .0       PuLac++ B4O5(OH)4=
1  .0       .0       .0       .0       PuLac++ Br-
1  .0       .0       .0       .0       PuLac++ Am(C03)2-
1  .0       .0       .0       .0       PuLac++ Am(C03)3=-
1  .0       .0       .0       .0       PuLac++ C104-
1  .0       .0       .0       .0       PuLac++ Np02(OH)2-
1  .0       .0       .0       .0       PuLac++ Np02C03=
1  .0       .0       .0       .0       PuLac++ Np02(C03)2==
1  .0       .0       .0       .0       PuLac++ Np02(C03)3===
1  .0       .0       .0       .0       PuLac++ H2P04-
1  .0       .0       .0       .0       PuLac++ HP04=
1  .0       .0       .0       .0       PuLac++ P04---
1  .0       .0       .0       .0       PuLac++ Th(S04)3-
1  .0       .0       .0       .0       PuLac++ Th(OH)3(C03)-
1  .0       .0       .0       .0       PuLac++ Th(C03)5---
1  .0       .0       .0       .0       PuLac++ HOx-
1  .0       .0       .0       .0       PuLac++ Ox=
1  .0       .0       .0       .0       PuLac++ Ac-
1  .0       .0       .0       .0       PuLac++ Lac-
1  .0       .0       .0       .0       PuLac++ H2Cit-
1  .0       .0       .0       .0       PuLac++ HCit=
1  .0       .0       .0       .0       PuLac++ Cit---
1  .0       .0       .0       .0       PuLac++ H3EDTA-
1  .0       .0       .0       .0       PuLac++ H2EDTA=
1  .0       .0       .0       .0       PuLac++ HEDTA--
1  .0       .0       .0       .0       PuLac++ EDTA----
1  .0       .0       .0       .0       PuLac++ AmEDTA--
1  .0       .0       .0       .0       PuLac++ Np02Cit=
1  .0       .0       .0       .0       PuLac++ Np02EDTA----
1  .0       .0       .0       .0       PuLac++ Np02Ox-
1  .0       .0       .0       .0       PuLac++ U(OH)4(C03)2--
1  .0       .0       .0       .0       PuLac++ U(C03)5---
1  .0       .0       .0       .0       PuLac++ U(S04)3=
1  .0       .0       .0       .0       PuLac++ Pu(C03)2-
1  .0       .0       .0       .0       PuLac++ Pu(C03)3--
1  .0       .0       .0       .0       PuLac++ PuEDTA-
1  .0       .0       .0       .0       PuLac++ CaCit-
1  .0       .0       .0       .0       PuLac++ CaEDTA=
1  .0       .0       .0       .0       PuLac++ UnuAn02-
1  .0       .0       .0       .0       PuLac++ UnuAn03-
```

```
1  .0       .0       .0       .0       PuLac++ UnuAn#4-
1  .0       .0       .0       .0       PuLac++ U(OH)2(CO3)2-
1  .0       .0       .0       .0       PuLac++ MgCit-
1  .0       .0       .0       .0       PuLac++ MgEDTA=
1  .0       .0       .0       .0       PuLac++ UnuAn#1-

1  .1698    .0       .0       .0       CaAc+ Cl-       analogy w/Mg++
1  .0       .0       .0       .0       CaAc+ SO4=
1  .0       .0       .0       .0       CaAc+ HSO4-
1  .0       .0       .0       .0       CaAc+ OH-
1  .0       .0       .0       .0       CaAc+ HCO3-
1  .0       .0       .0       .0       CaAc+ CO3=
1  .0       .0       .0       .0       CaAc+ B(OH)4-
1  .0       .0       .0       .0       CaAc+ B3O3(OH)4-
1  .0       .0       .0       .0       CaAc+ B4O5(OH)4=
1  .0       .0       .0       .0       CaAc+ Br-
1  .0       .0       .0       .0       CaAc+ Am(CO3)2-
1  .0       .0       .0       .0       CaAc+ Am(CO3)3=
1  .0       .0       .0       .0       CaAc+ ClO4-
1  .0       .0       .0       .0       CaAc+ NpO2(OH)2-
1  .0       .0       .0       .0       CaAc+ NpO2CO3-
1  .0       .0       .0       .0       CaAc+ NpO2(CO3)2=
1  .0       .0       .0       .0       CaAc+ NpO2(CO3)3---
1  .0       .0       .0       .0       CaAc+ H2PO4-
1  .0       .0       .0       .0       CaAc+ HPO4=
1  .0       .0       .0       .0       CaAc+ PO4=-
1  .0       .0       .0       .0       CaAc+ Th(SO4)3=
1  .0       .0       .0       .0       CaAc+ Th(OH)3(CO3)-
1  .0       .0       .0       .0       CaAc+ Th(CO3)5===
1  .0       .0       .0       .0       CaAc+ HOx-
1  .0       .0       .0       .0       CaAc+ Ox=
1  .0       .0       .0       .0       CaAc+ Ac-
1  .0       .0       .0       .0       CaAc+ Lac-
1  .0       .0       .0       .0       CaAc+ H2Cit-
1  .0       .0       .0       .0       CaAc+ HCit=
1  .0       .0       .0       .0       CaAc+ Cit---
1  .0       .0       .0       .0       CaAc+ H3EDTA-
1  .0       .0       .0       .0       CaAc+ H2EDTA=
1  .0       .0       .0       .0       CaAc+ HEDTA--
1  .0       .0       .0       .0       CaAc+ EDTA---
1  .0       .0       .0       .0       CaAc+ AmEDTA--
1  .0       .0       .0       .0       CaAc+ NpO2Cit=
1  .0       .0       .0       .0       CaAc+ NpO2EDTA---
1  .0       .0       .0       .0       CaAc+ NpO2Ox-
1  .0       .0       .0       .0       CaAc+ U(OH)4(CO3)2--
1  .0       .0       .0       .0       CaAc+ U(CO3)5---
1  .0       .0       .0       .0       CaAc+ U(SO4)3-
1  .0       .0       .0       .0       CaAc+ Pu(CO3)2-
1  .0       .0       .0       .0       CaAc+ Pu(CO3)3=-
1  .0       .0       .0       .0       CaAc+ PuEDTA-
1  .0       .0       .0       .0       CaAc+ CaCit-
1  .0       .0       .0       .0       CaAc+ CaEDTA=
1  .0       .0       .0       .0       CaAc+ UnuAn#2-
1  .0       .0       .0       .0       CaAc+ UnuAn#3-
1  .0       .0       .0       .0       CaAc+ UnuAn#4-
1  .0       .0       .0       .0       CaAc+ U(OH)2(CO3)2=
1  .0       .0       .0       .0       CaAc+ MgCit-
1  .0       .0       .0       .0       CaAc+ MgEDTA-
1  .0       .0       .0       .0       CaAc+ UnuAn#1-

1  .0       .0       .0       .0       CaLac+ Cl-
1  .0       .0       .0       .0       CaLac+ SO4=
1  .0       .0       .0       .0       CaLac+ HSO4-
1  .0       .0       .0       .0       CaLac+ OH-
1  .0       .0       .0       .0       CaLac+ HCO3-
1  .0       .0       .0       .0       CaLac+ CO3=
1  .0       .0       .0       .0       CaLac+ B(OH)4-
1  .0       .0       .0       .0       CaLac+ B3O3(OH)4-
1  .0       .0       .0       .0       CaLac+ B4O5(OH)4=
1  .0       .0       .0       .0       CaLac+ Br-
1  .0       .0       .0       .0       CaLac+ Am(CO3)2-
1  .0       .0       .0       .0       CaLac+ Am(CO3)3=
1  .0       .0       .0       .0       CaLac+ ClO4-
1  .0       .0       .0       .0       CaLac+ NpO2(OH)2-
1  .0       .0       .0       .0       CaLac+ NpO2CO3-
1  .0       .0       .0       .0       CaLac+ NpO2(CO3)2=
1  .0       .0       .0       .0       CaLac+ NpO2(CO3)3---
1  .0       .0       .0       .0       CaLac+ H2PO4-
1  .0       .0       .0       .0       CaLac+ HPO4=
1  .0       .0       .0       .0       CaLac+ PO4=-
1  .0       .0       .0       .0       CaLac+ Th(SO4)3=
1  .0       .0       .0       .0       CaLac+ Th(OH)3(CO3)-
1  .0       .0       .0       .0       CaLac+ Th(CO3)5===
1  .0       .0       .0       .0       CaLac+ HOx-
1  .0       .0       .0       .0       CaLac+ Ox=
1  .0       .0       .0       .0       CaLac+ Ac-
1  .0       .0       .0       .0       CaLac+ Lac-
1  .0       .0       .0       .0       CaLac+ H2Cit-
1  .0       .0       .0       .0       CaLac+ HCit=
1  .0       .0       .0       .0       CaLac+ Cit---
1  .0       .0       .0       .0       CaLac+ H3EDTA-
1  .0       .0       .0       .0       CaLac+ H2EDTA=
1  .0       .0       .0       .0       CaLac+ HEDTA--
1  .0       .0       .0       .0       CaLac+ EDTA---
1  .0       .0       .0       .0       CaLac+ AmEDTA--
1  .0       .0       .0       .0       CaLac+ NpO2Cit=
1  .0       .0       .0       .0       CaLac+ NpO2EDTA---
1  .0       .0       .0       .0       CaLac+ NpO2Ox-
1  .0       .0       .0       .0       CaLac+ U(OH)4(CO3)2--
1  .0       .0       .0       .0       CaLac+ U(CO3)5---
1  .0       .0       .0       .0       CaLac+ U(SO4)3-
1  .0       .0       .0       .0       CaLac+ Pu(CO3)2-
1  .0       .0       .0       .0       CaLac+ Pu(CO3)3=-
1  .0       .0       .0       .0       CaLac+ PuEDTA-
1  .0       .0       .0       .0       CaLac+ CaCit-
1  .0       .0       .0       .0       CaLac+ CaEDTA=
1  .0       .0       .0       .0       CaLac+ UnuAn#2-
1  .0       .0       .0       .0       CaLac+ UnuAn#3-
1  .0       .0       .0       .0       CaLac+ UnuAn#4-
1  .0       .0       .0       .0       CaLac+ U(OH)2(CO3)2=
1  .0       .0       .0       .0       CaLac+ MgCit-
1  .0       .0       .0       .0       CaLac+ MgEDTA=
1  .0       .0       .0       .0       CaLac+ UnuAn#1-

1  .1896    .0       .0       .0       MgAc+ Cl-          RGM96c
1  .0       .0       .0       .0       MgAc+ SO4=
1  .0       .0       .0       .0       MgAc+ HSO4-
1  .0       .0       .0       .0       MgAc+ OH-
1  .0       .0       .0       .0       MgAc+ HCO3-
1  .0       .0       .0       .0       MgAc+ CO3=
1  .0       .0       .0       .0       MgAc+ B(OH)4-
1  .0       .0       .0       .0       MgAc+ B3O3(OH)4-
1  .0       .0       .0       .0       MgAc+ B4O5(OH)4-
1  .0       .0       .0       .0       MgAc+ Br-
1  .0       .0       .0       .0       MgAc+ Am(CO3)2-
1  .0       .0       .0       .0       MgAc+ Am(CO3)3=-
1  .0       .0       .0       .0       MgAc+ ClO4-
1  .0       .0       .0       .0       MgAc+ NpO2(OH)2-
1  .0       .0       .0       .0       MgAc+ NpO2CO3-
1  .0       .0       .0       .0       MgAc+ NpO2(CO3)2=-
1  .0       .0       .0       .0       MgAc+ NpO2(CO3)3=--
1  .0       .0       .0       .0       MgAc+ H2PO4-
1  .0       .0       .0       .0       MgAc+ HPO4=
1  .0       .0       .0       .0       MgAc+ PO4=-
1  .0       .0       .0       .0       MgAc+ Th(SO4)3=
1  .0       .0       .0       .0       MgAc+ Th(OH)3(CO3)-
1  .0       .0       .0       .0       MgAc+ Th(CO3)5===
1  .0       .0       .0       .0       MgAc+ HOx-
1  .0       .0       .0       .0       MgAc+ Ox=
1  .0       .0       .0       .0       MgAc+ Ac-
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1 .0    .0    .0    .0    MgAc+ Lac-
1 .0    .0    .0    .0    MgAc+ H2Cit-
1 .0    .0    .0    .0    MgAc+ HCit=
1 .0    .0    .0    .0    MgAc+ Cit--
1 .0    .0    .0    .0    MgAc+ H3EDTA-
1 .0    .0    .0    .0    MgAc+ H2EDTA=
1 .0    .0    .0    .0    MgAc+ HEDTA--
1 .0    .0    .0    .0    MgAc+ EDTA--
1 .0    .0    .0    .0    MgAc+ AmEDTA=-
1 .0    .0    .0    .0    MgAc+ NpO2Cit=
1 .0    .0    .0    .0    MgAc+ NpO2EDTA---
1 .0    .0    .0    .0    MgAc+ NpO2Ox-
1 .0    .0    .0    .0    MgAc+ U(OH)4(CO3)2--
1 .0    .0    .0    .0    MgAc+ U(CO3)5===
1 .0    .0    .0    .0    MgAc+ U(SO4)3=
1 .0    .0    .0    .0    MgAc+ Pu(CO3)2-
1 .0    .0    .0    .0    MgAc+ Pu(CO3)3=-
1 .0    .0    .0    .0    MgAc+ PuEDTA-
1 .0    .0    .0    .0    MgAc+ CaCit-
1 .0    .0    .0    .0    MgAc+ CaEDTA=
1 .0    .0    .0    .0    MgAc+ UnuAn#2-
1 .0    .0    .0    .0    MgAc+ UnuAn#3-
1 .0    .0    .0    .0    MgAc+ UnuAn#4-
1 .0    .0    .0    .0    MgAc+ U(OH)2(CO3)2=
1 .0    .0    .0    .0    MgAc+ MgCit-
1 .0    .0    .0    .0    MgAc+ MgEDTA=
1 .0    .0    .0    .0    MgAc+ UnuAn#1-

1 .0    .0    .0    .0    MgLac+ Cl-
1 .0    .0    .0    .0    MgLac+ SO4=
1 .0    .0    .0    .0    MgLac+ HSO4-
1 .0    .0    .0    .0    MgLac+ OH-
1 .0    .0    .0    .0    MgLac+ HCO3-
1 .0    .0    .0    .0    MgLac+ CO3=
1 .0    .0    .0    .0    MgLac+ B(OH)4-
1 .0    .0    .0    .0    MgLac+ B3O3(OH)4-
1 .0    .0    .0    .0    MgLac+ B4O5(OH)4=
1 .0    .0    .0    .0    MgLac+ Br-
1 .0    .0    .0    .0    MgLac+ Am(CO3)2-
1 .0    .0    .0    .0    MgLac+ Am(CO3)3=-
1 .0    .0    .0    .0    MgLac+ ClO4-
1 .0    .0    .0    .0    MgLac+ NpO2(OH)2-
1 .0    .0    .0    .0    MgLac+ NpO2CO3-
1 .0    .0    .0    .0    MgLac+ NpO2(CO3)2=-
1 .0    .0    .0    .0    MgLac+ NpO2(CO3)3==-
1 .0    .0    .0    .0    MgLac+ H2PO4-
1 .0    .0    .0    .0    MgLac+ HPO4=
1 .0    .0    .0    .0    MgLac+ PO4--
1 .0    .0    .0    .0    MgLac+ Th(SO4)3=
1 .0    .0    .0    .0    MgLac+ Th(OH)3(CO3)-
1 .0    .0    .0    .0    MgLac+ Th(CO3)5---
1 .0    .0    .0    .0    MgLac+ HOx-
1 .0    .0    .0    .0    MgLac+ Ox=
1 .0    .0    .0    .0    MgLac+ Ac-
1 .0    .0    .0    .0    MgLac+ Lac-
1 .0    .0    .0    .0    MgLac+ H2Cit-
1 .0    .0    .0    .0    MgLac+ HCit=
1 .0    .0    .0    .0    MgLac+ Cit--
1 .0    .0    .0    .0    MgLac+ H3EDTA-
1 .0    .0    .0    .0    MgLac+ H2EDTA=
1 .0    .0    .0    .0    MgLac+ HEDTA--
1 .0    .0    .0    .0    MgLac+ EDTA--
1 .0    .0    .0    .0    MgLac+ AmEDTA=-
1 .0    .0    .0    .0    MgLac+ NpO2Cit=
1 .0    .0    .0    .0    MgLac+ NpO2EDTA==-
1 .0    .0    .0    .0    MgLac+ NpO2Ox-
1 .0    .0    .0    .0    MgLac+ U(OH)4(CO3)2--
1 .0    .0    .0    .0    MgLac+ U(CO3)5===
1 .0    .0    .0    .0    MgLac+ U(SO4)3=
1 .0    .0    .0    .0    MgLac+ Pu(CO3)2-
1 .0    .0    .0    .0    MgLac+ Pu(CO3)3--
1 .0    .0    .0    .0    MgLac+ PuEDTA-
1 .0    .0    .0    .0    MgLac+ CaCit-
1 .0    .0    .0    .0    MgLac+ CaEDTA=
1 .0    .0    .0    .0    MgLac+ UnuAn#2-
1 .0    .0    .0    .0    MgLac+ UnuAn#3-
1 .0    .0    .0    .0    MgLac+ UnuAn#4-
1 .0    .0    .0    .0    MgLac+ U(OH)2(CO3)2=
1 .0    .0    .0    .0    MgLac+ MgCit-
1 .0    .0    .0    .0    MgLac+ MgEDTA=
1 .0    .0    .0    .0    MgLac+ UnuAn#1-

1 .0    .0    .0    .0    UnuCat#1+ Cl-
1 .0    .0    .0    .0    UnuCat#1+ SO4=
1 .0    .0    .0    .0    UnuCat#1+ HSO4-
1 .0    .0    .0    .0    UnuCat#1+ OH-
1 .0    .0    .0    .0    UnuCat#1+ HCO3-
1 .0    .0    .0    .0    UnuCat#1+ CO3=
1 .0    .0    .0    .0    UnuCat#1+ B(OH)4-
1 .0    .0    .0    .0    UnuCat#1+ B3O3(OH)4-
1 .0    .0    .0    .0    UnuCat#1+ B4O5(OH)4=
1 .0    .0    .0    .0    UnuCat#1+ Br-
1 .0    .0    .0    .0    UnuCat#1+ Am(CO3)2-
1 .0    .0    .0    .0    UnuCat#1+ Am(CO3)3=-
1 .0    .0    .0    .0    UnuCat#1+ ClO4-
1 .0    .0    .0    .0    UnuCat#1+ NpO2(OH)2-
1 .0    .0    .0    .0    UnuCat#1+ NpO2CO3-
1 .0    .0    .0    .0    UnuCat#1+ NpO2(CO3)2=-
1 .0    .0    .0    .0    UnuCat#1+ NpO2(CO3)3---
1 .0    .0    .0    .0    UnuCat#1+ H2PO4-
1 .0    .0    .0    .0    UnuCat#1+ HPO4=
1 .0    .0    .0    .0    UnuCat#1+ PO4=-
1 .0    .0    .0    .0    UnuCat#1+ Th(SO4)3-
1 .0    .0    .0    .0    UnuCat#1+ Th(OH)3(CO3)-
1 .0    .0    .0    .0    UnuCat#1+ Th(CO3)5===
1 .0    .0    .0    .0    UnuCat#1+ HOx-
1 .0    .0    .0    .0    UnuCat#1+ Ox=
1 .0    .0    .0    .0    UnuCat#1+ Ac-
1 .0    .0    .0    .0    UnuCat#1+ Lac-
1 .0    .0    .0    .0    UnuCat#1+ H2Cit-
1 .0    .0    .0    .0    UnuCat#1+ HCit=
1 .0    .0    .0    .0    UnuCat#1+ Cit--
1 .0    .0    .0    .0    UnuCat#1+ H3EDTA-
1 .0    .0    .0    .0    UnuCat#1+ H2EDTA=
1 .0    .0    .0    .0    UnuCat#1+ HEDTA--
1 .0    .0    .0    .0    UnuCat#1+ EDTA==
1 .0    .0    .0    .0    UnuCat#1+ AmEDTA=-
1 .0    .0    .0    .0    UnuCat#1+ NpO2Cit=
1 .0    .0    .0    .0    UnuCat#1+ NpO2EDTA==-
1 .0    .0    .0    .0    UnuCat#1+ NpO2Ox-
1 .0    .0    .0    .0    UnuCat#1+ U(OH)4(CO3)2==
1 .0    .0    .0    .0    UnuCat#1+ U(CO3)5===
1 .0    .0    .0    .0    UnuCat#1+ U(SO4)3=
1 .0    .0    .0    .0    UnuCat#1+ Pu(CO3)2-
1 .0    .0    .0    .0    UnuCat#1+ Pu(CO3)3=-
1 .0    .0    .0    .0    UnuCat#1+ PuEDTA-
1 .0    .0    .0    .0    UnuCat#1+ CaCit-
1 .0    .0    .0    .0    UnuCat#1+ CaEDTA=
1 .0    .0    .0    .0    UnuCat#1+ UnuAn#2-
1 .0    .0    .0    .0    UnuCat#1+ UnuAn#3-
1 .0    .0    .0    .0    UnuCat#1+ UnuAn#4-
1 .0    .0    .0    .0    UnuCat#1+ U(OH)2(CO3)2=
1 .0    .0    .0    .0    UnuCat#1+ MgCit-
1 .0    .0    .0    .0    UnuCat#1+ MgEDTA=
1 .0    .0    .0    .0    UnuCat#1+ UnuAn#1-

-.012 .07 .07 0 .036 0 0 0 0 .42 .0   0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  Na   1 w/2-39) theta  CFN960119,WJ96
      .032    0 0 .005 0 0 0 0   0  0   0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  K:   2 w/3-39) theta
          .007 0 .092 0 0 0 0   0  0   0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  Ca:  3 w/4-39) theta
                0 .10  0 0 0 0 .60  0   0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  Mg:  4 w/5-39) theta  CFN960119
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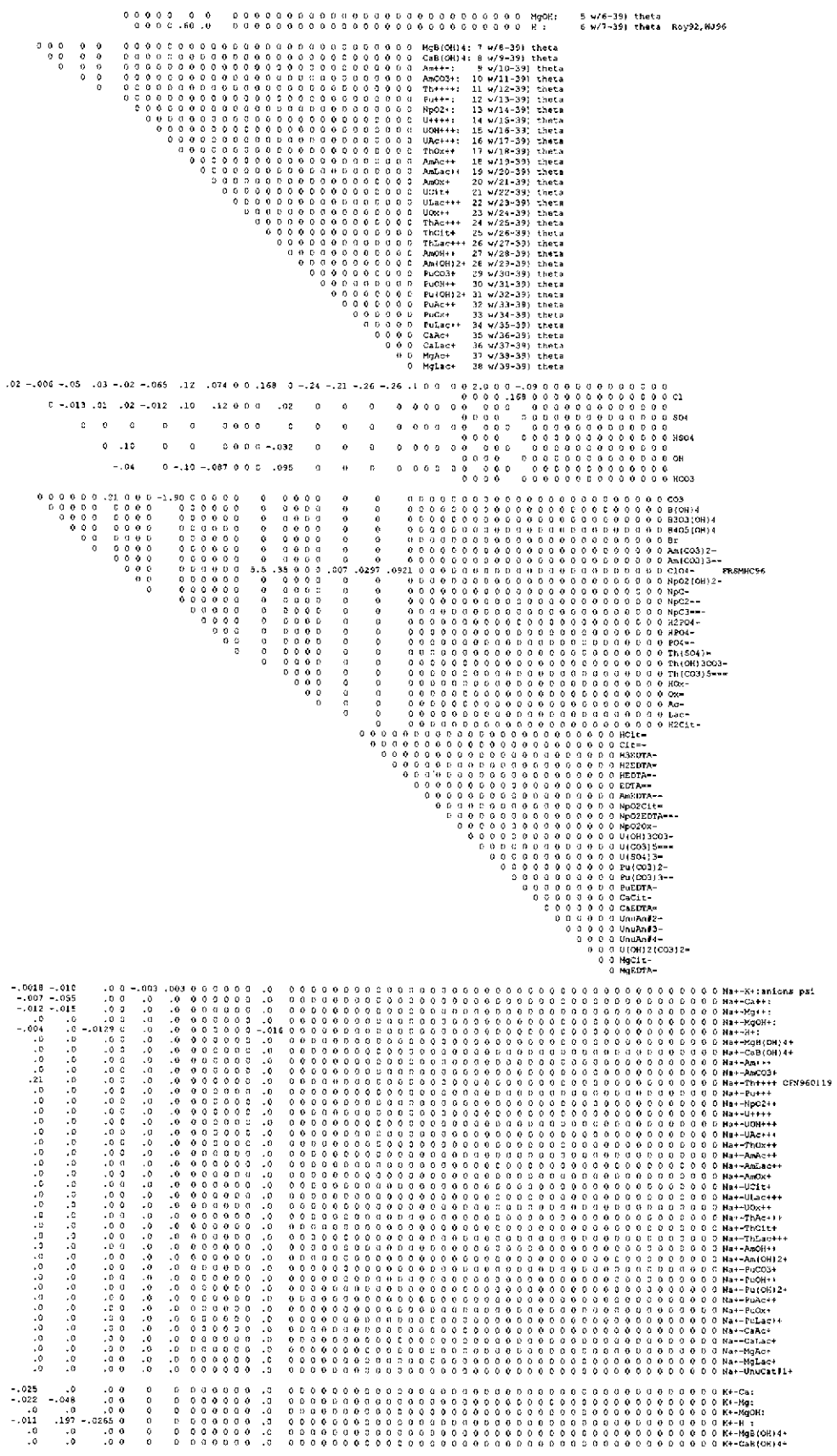
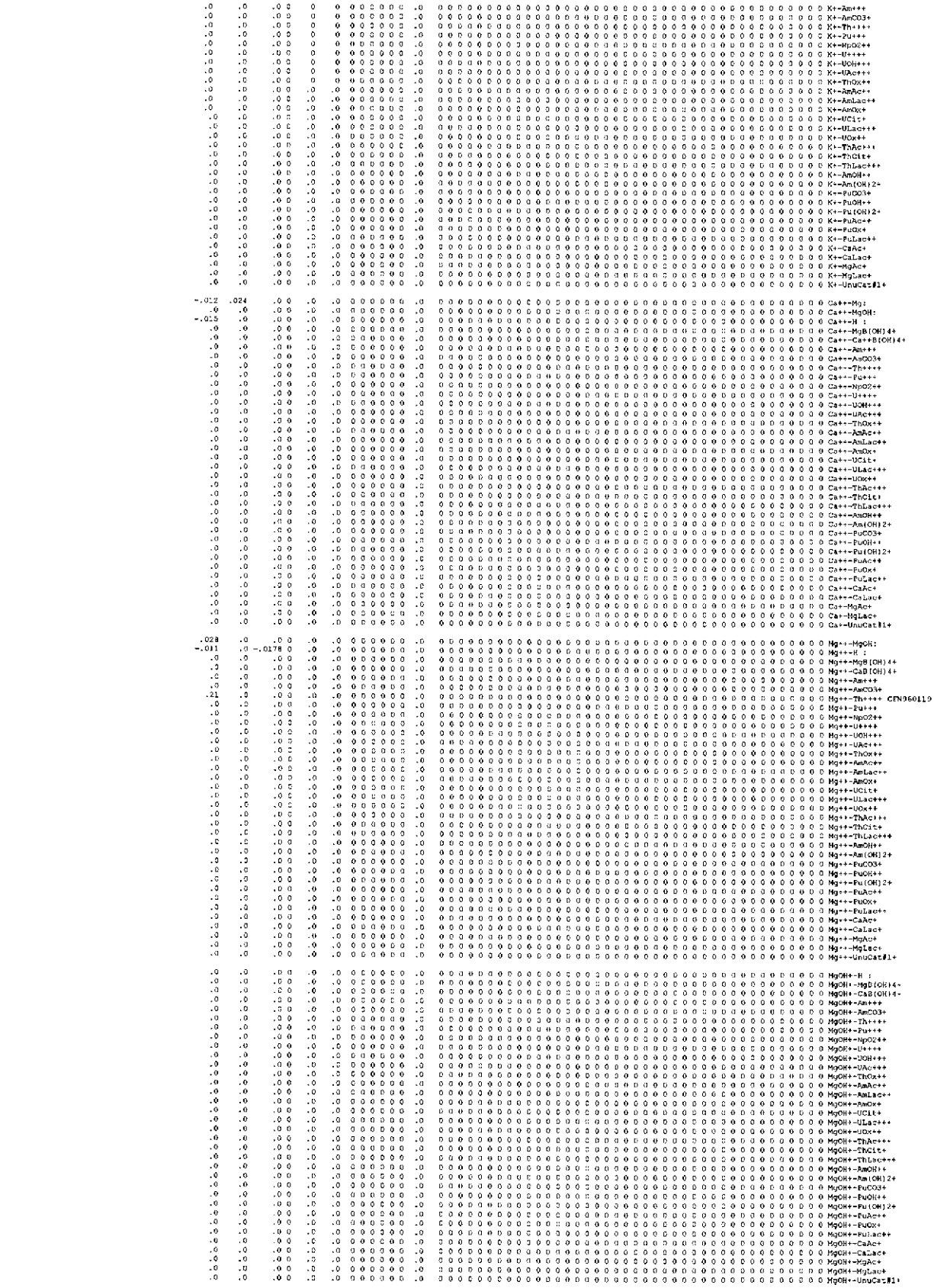
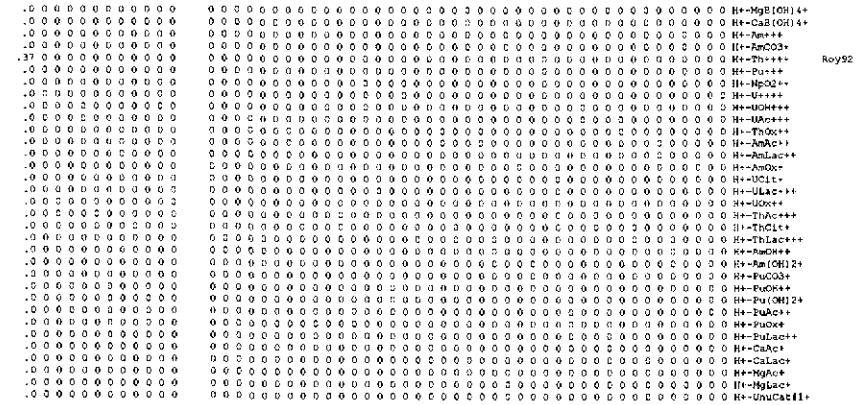
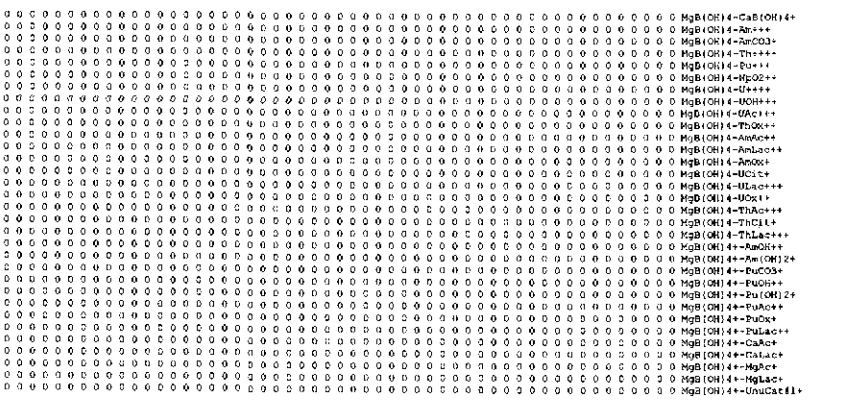
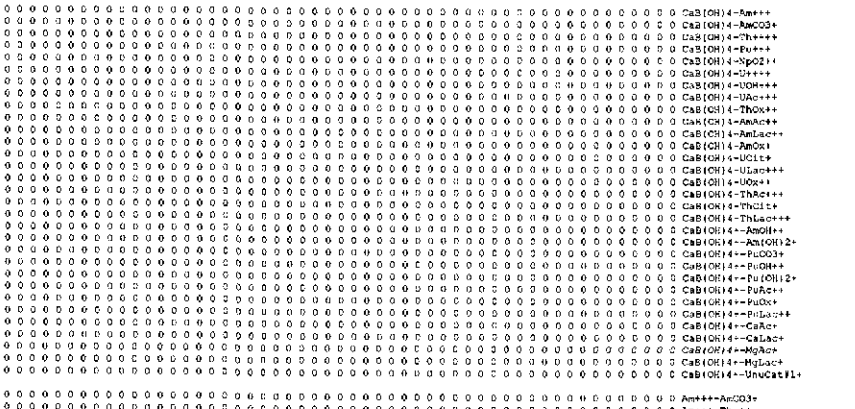
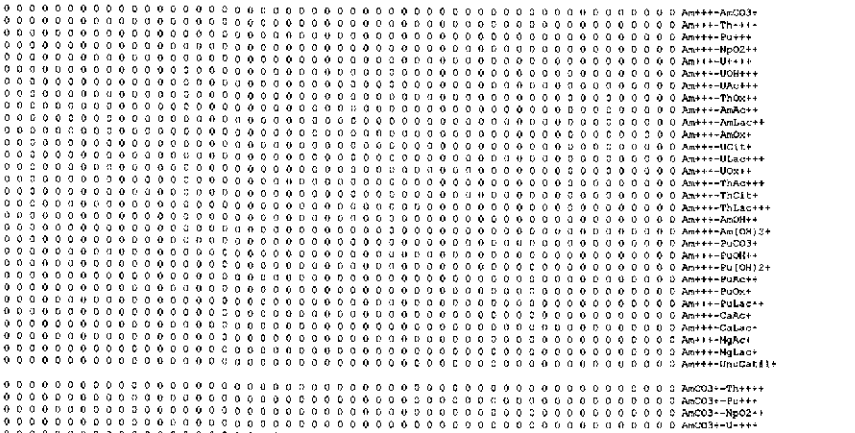


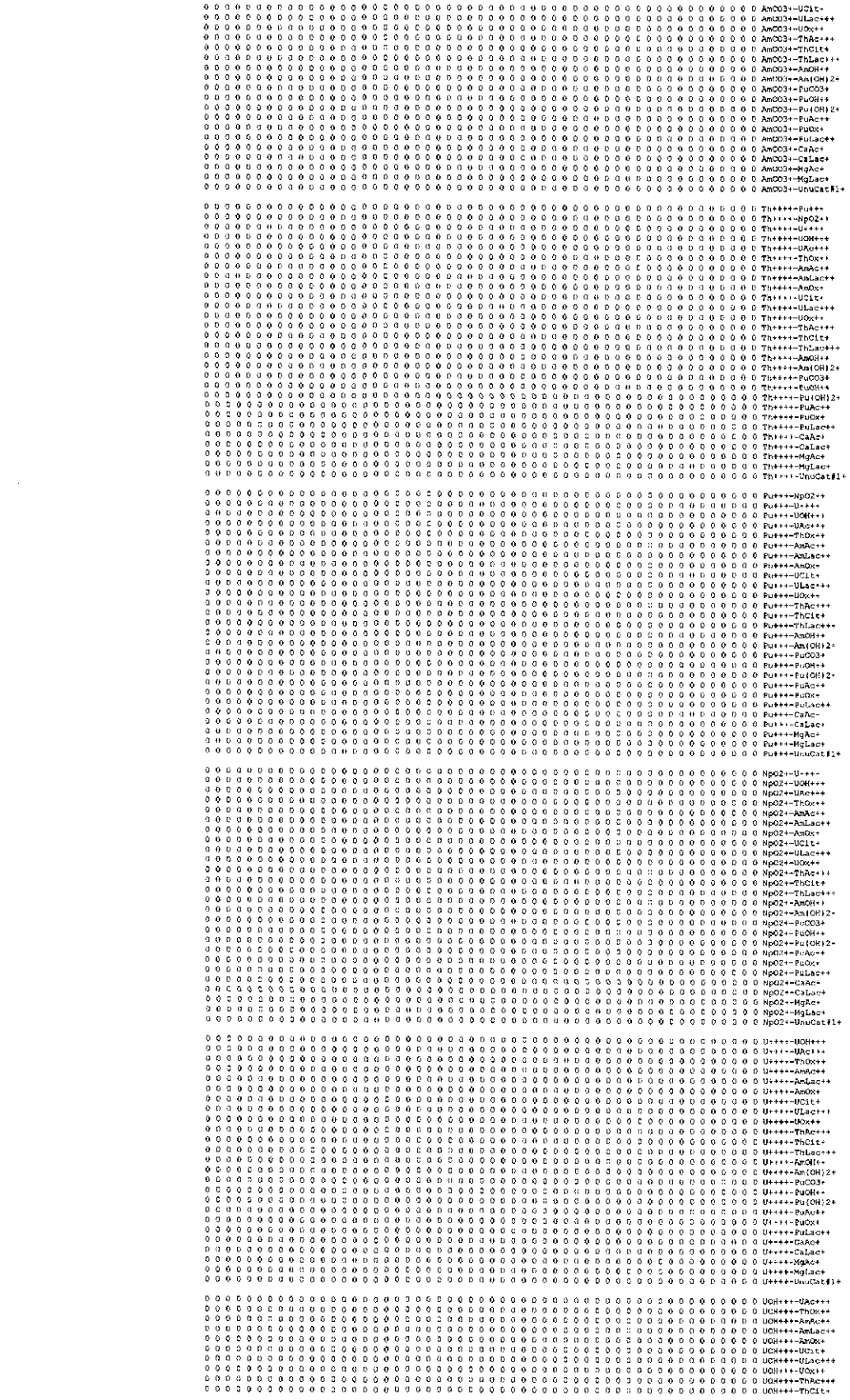


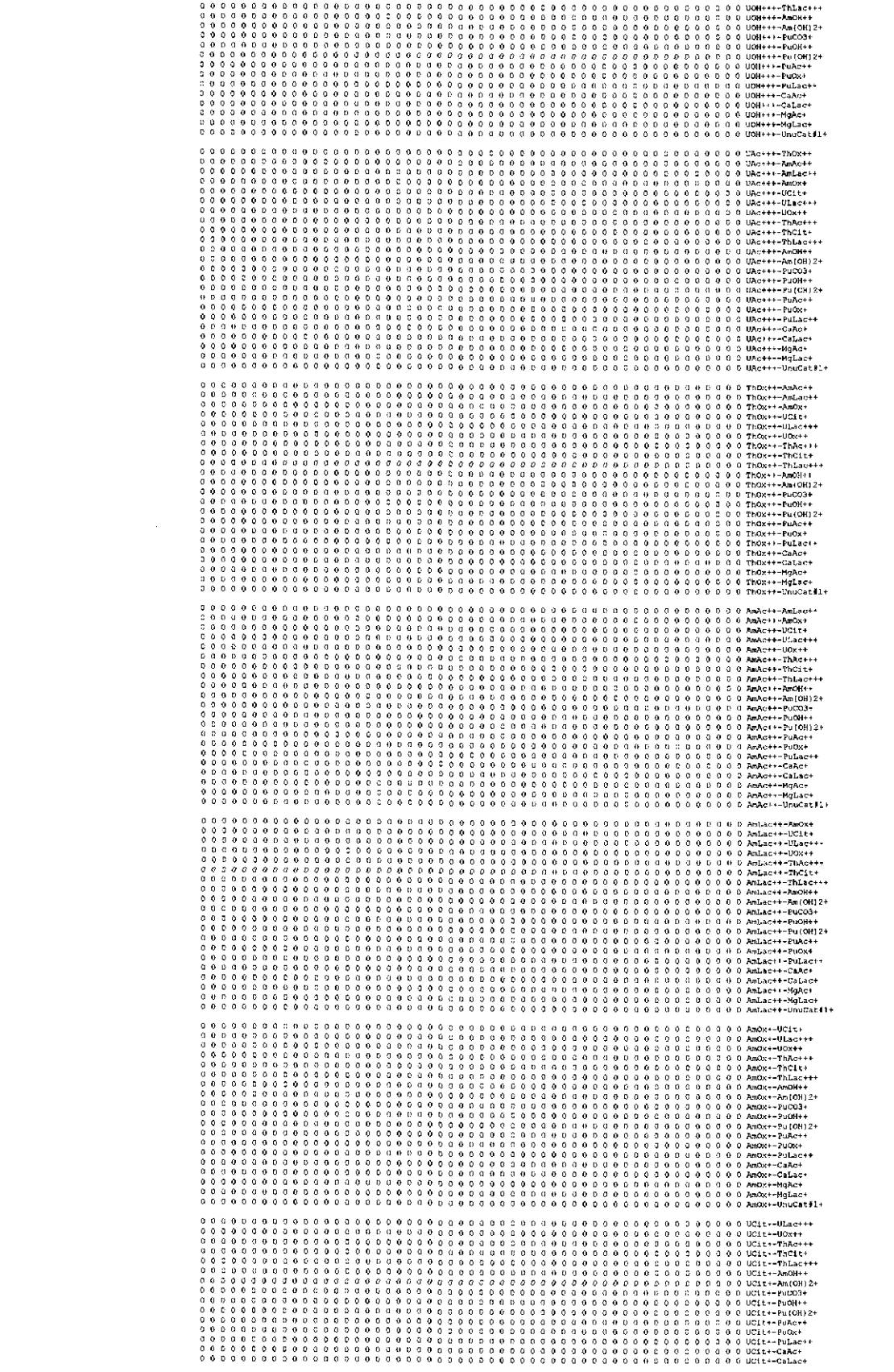


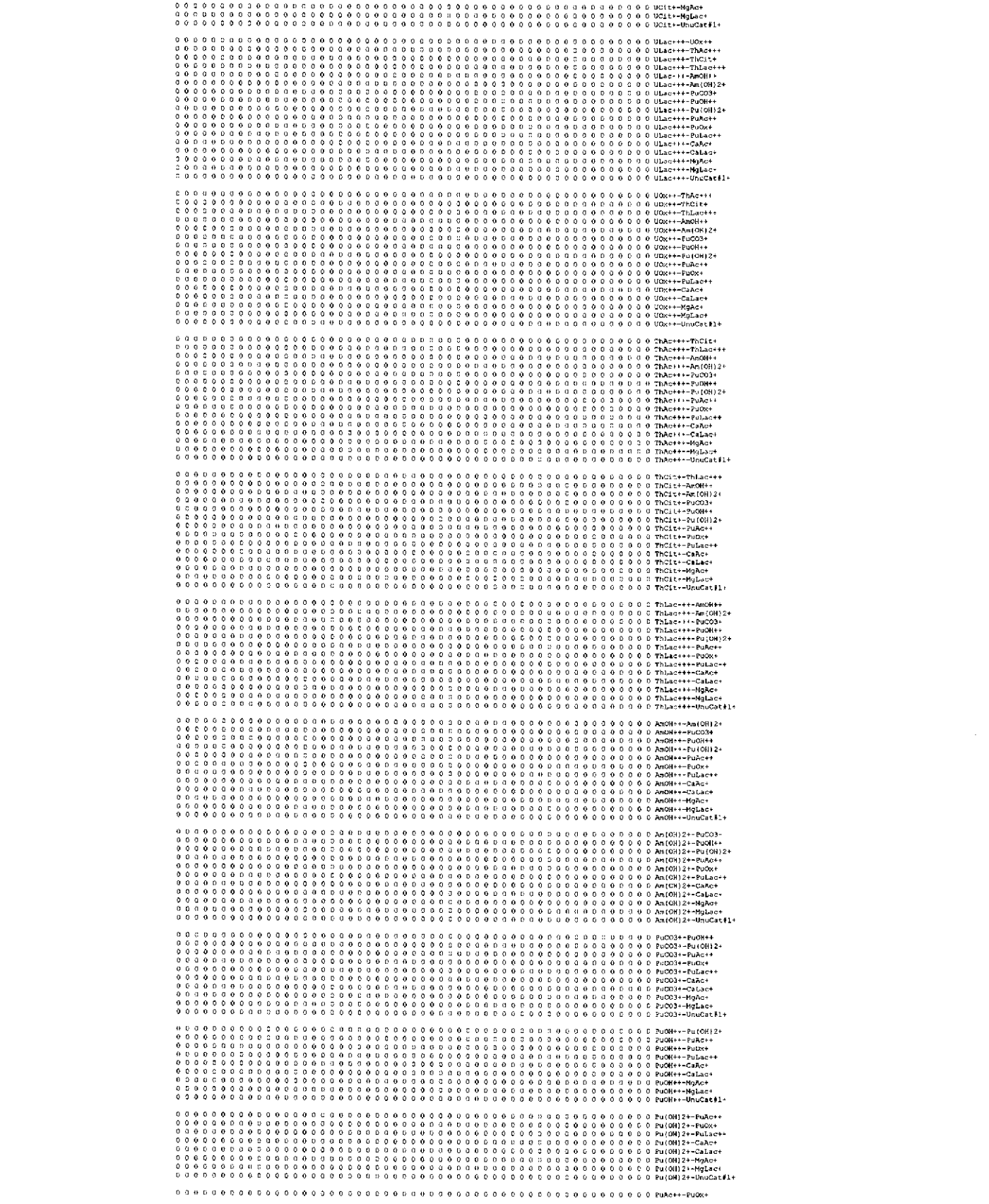


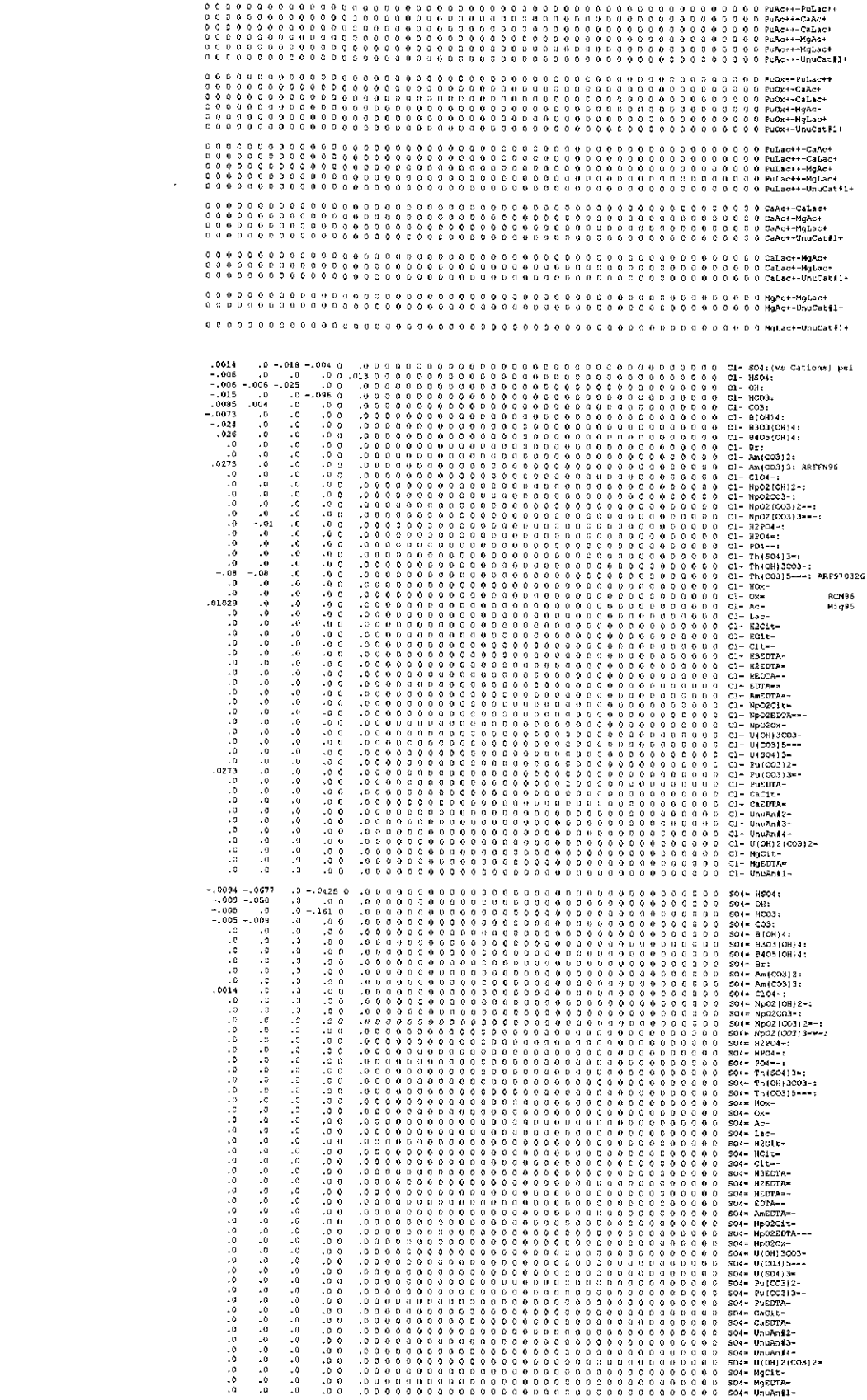


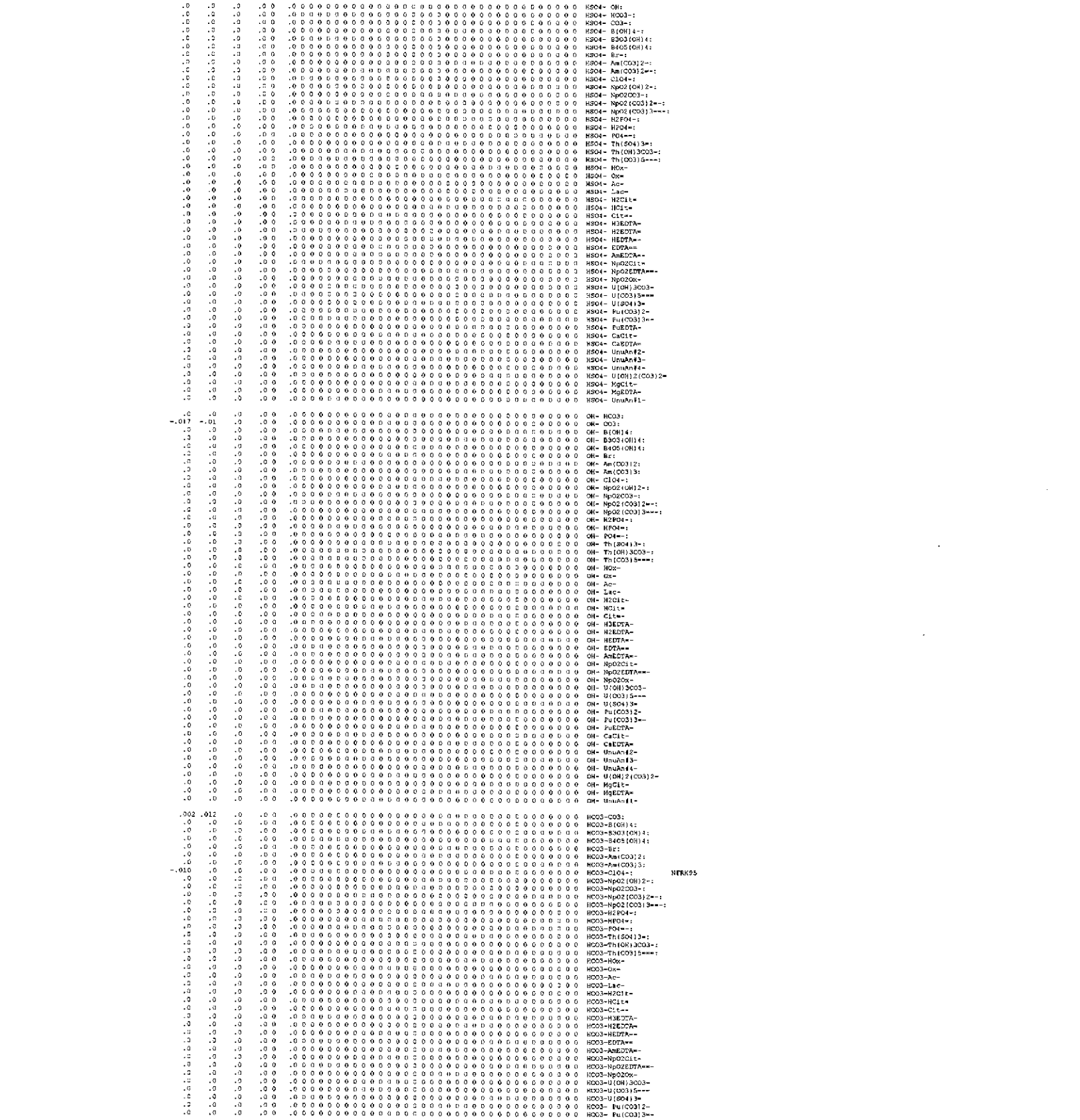


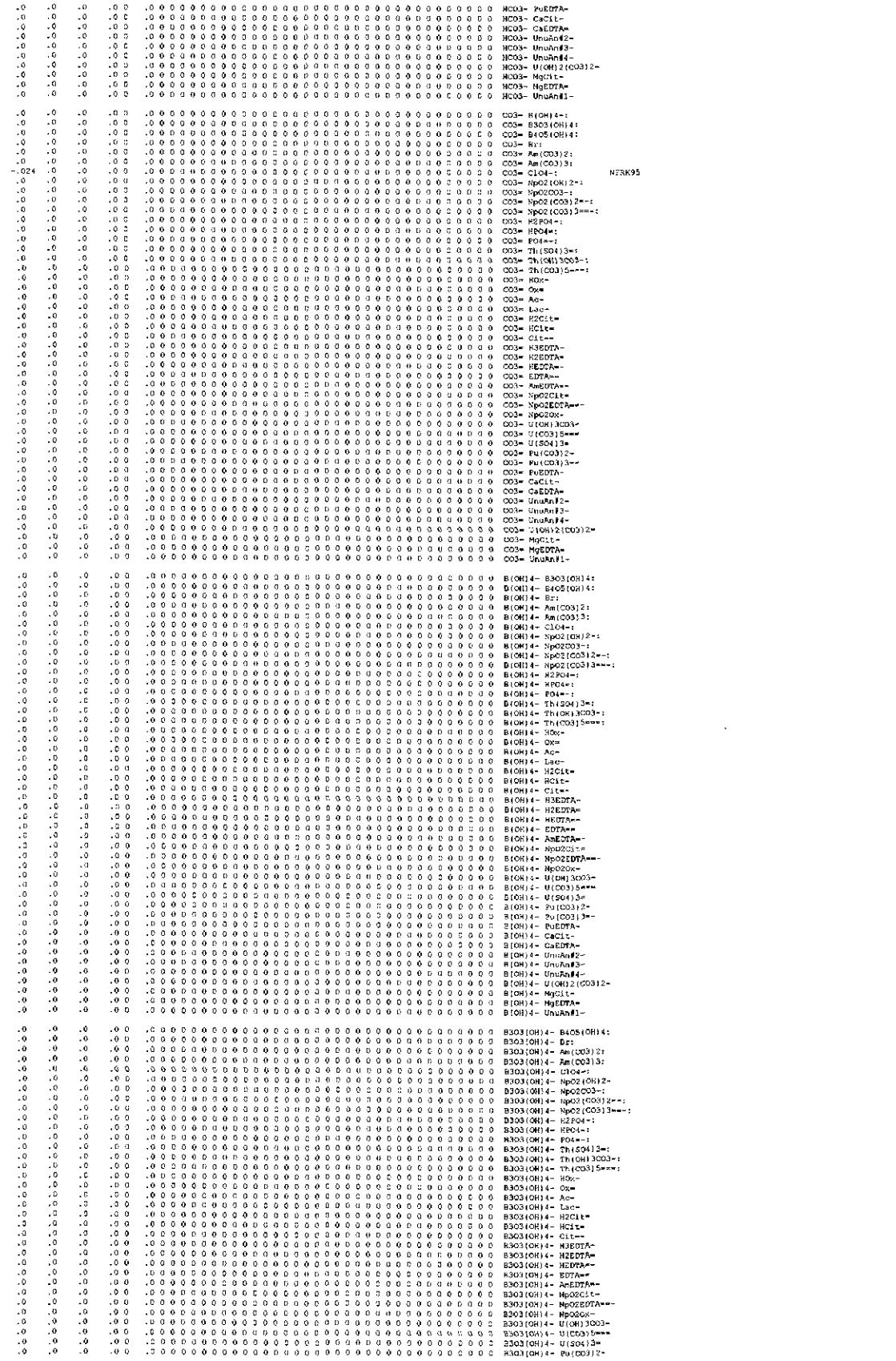


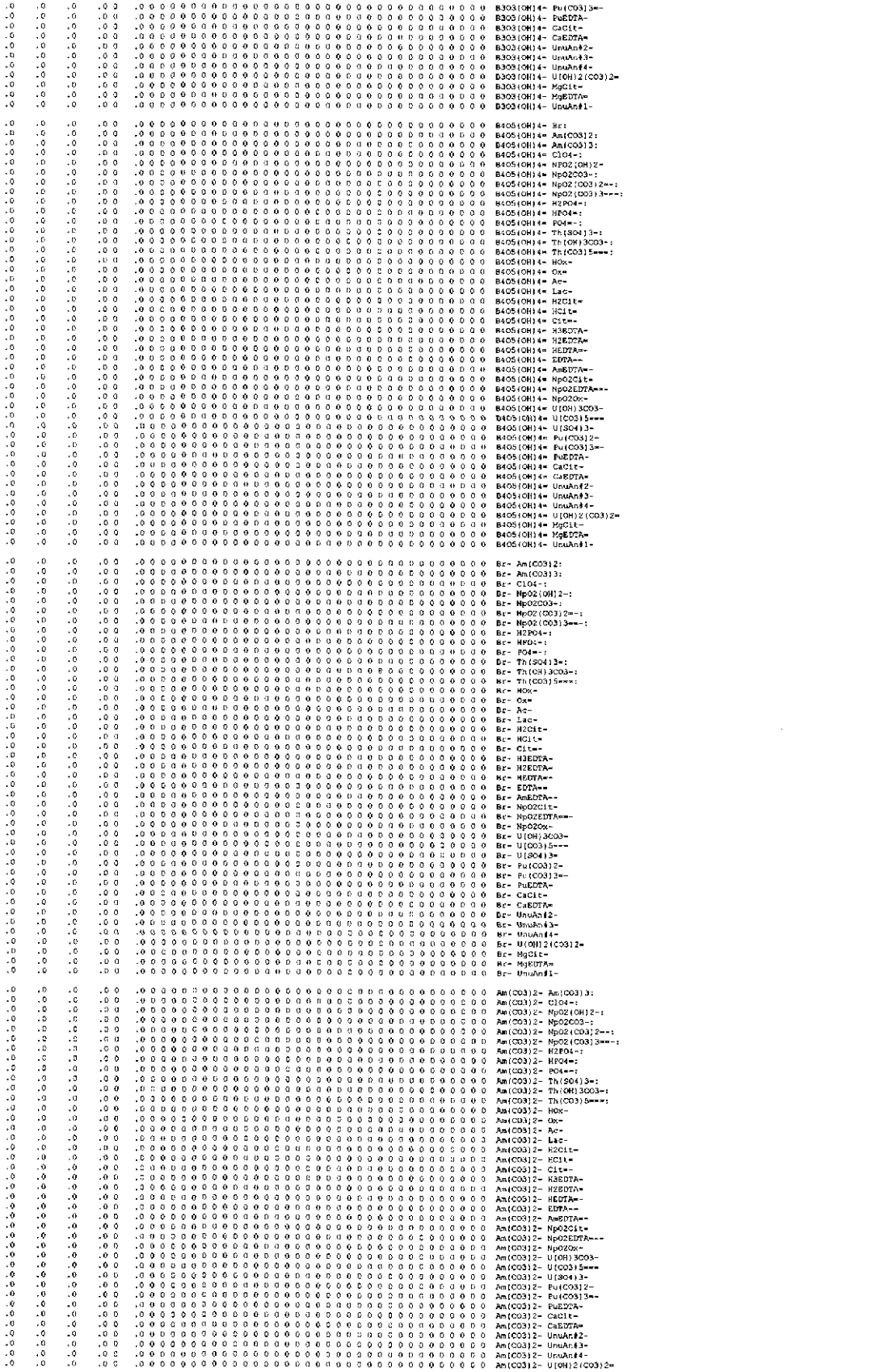


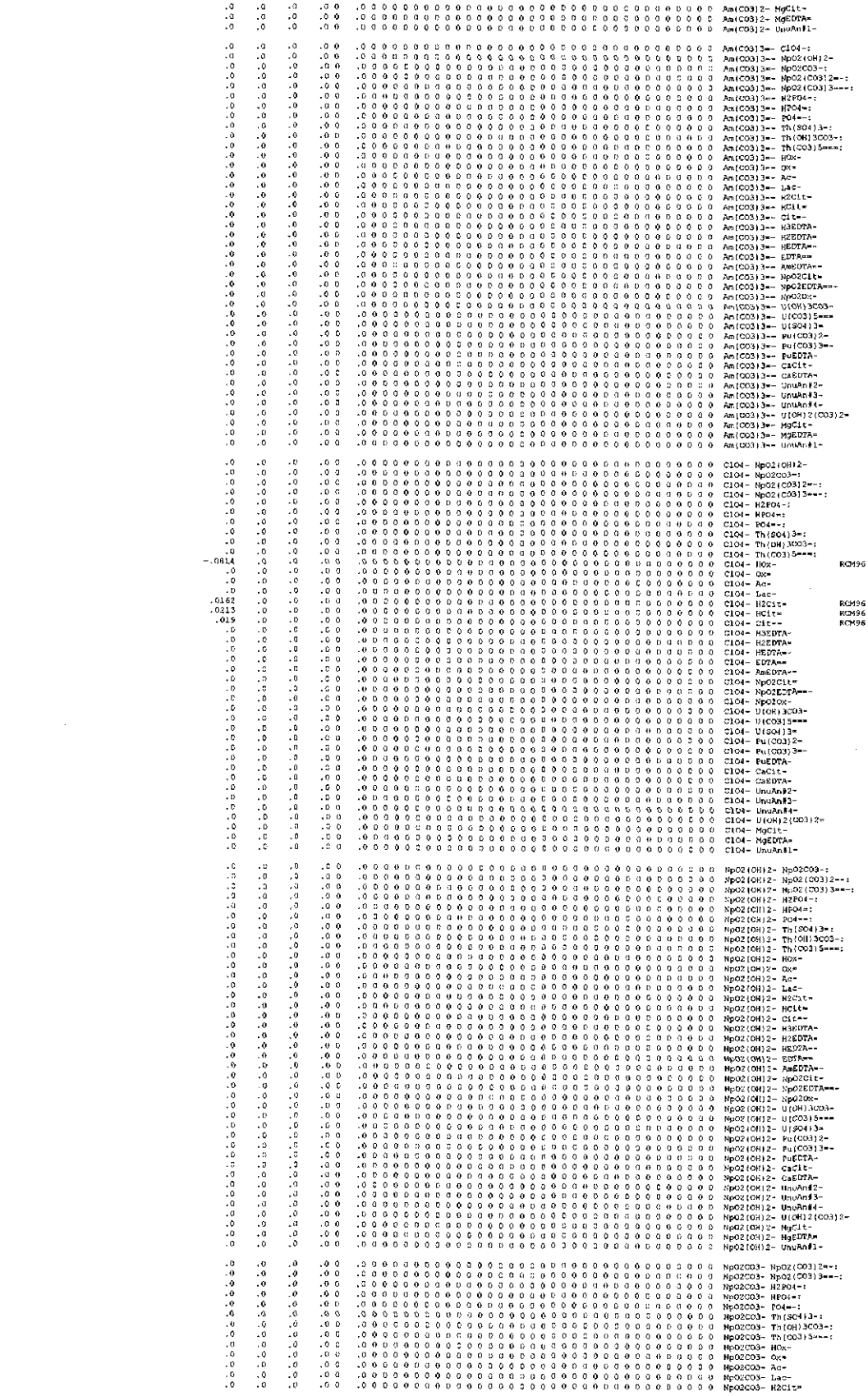


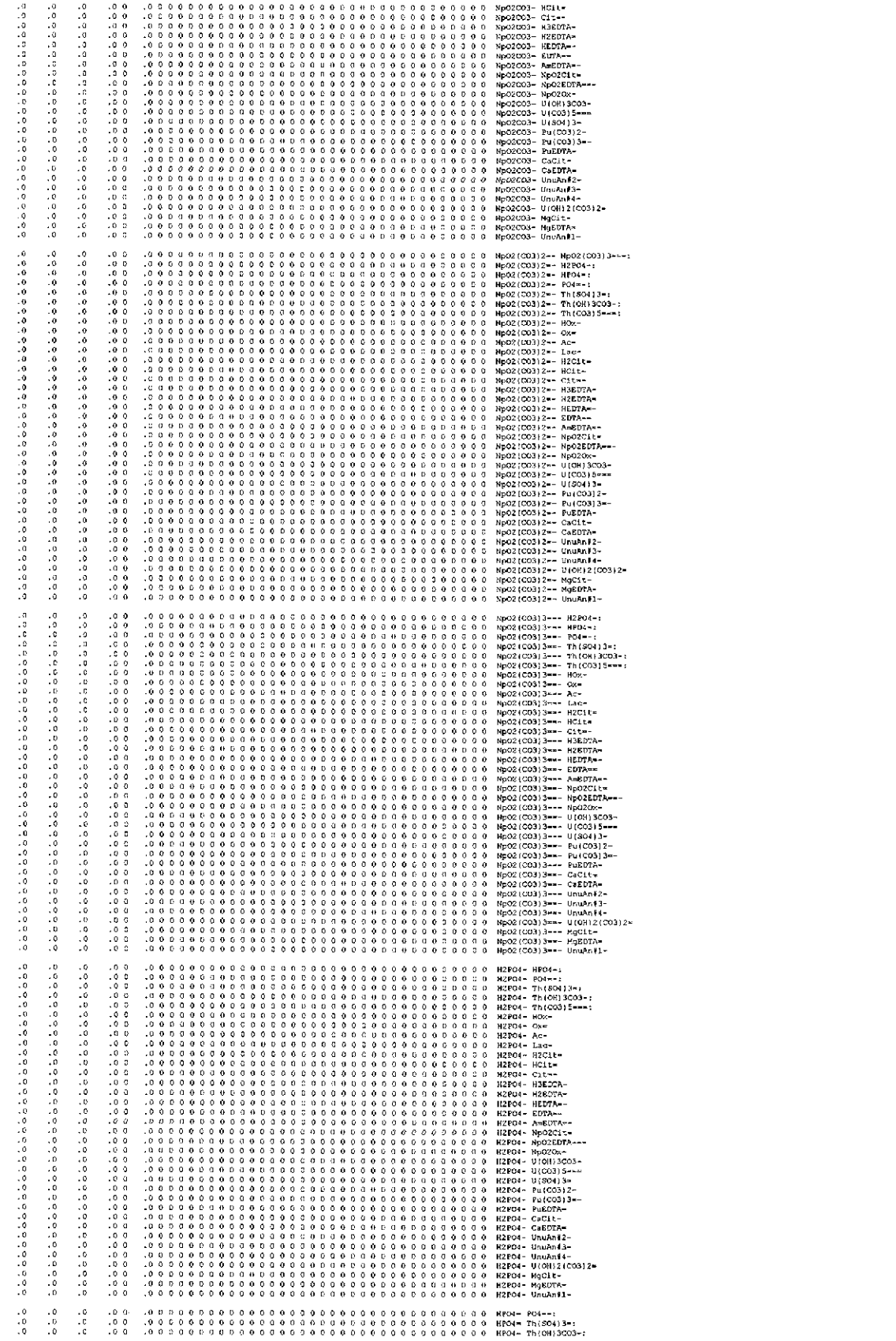


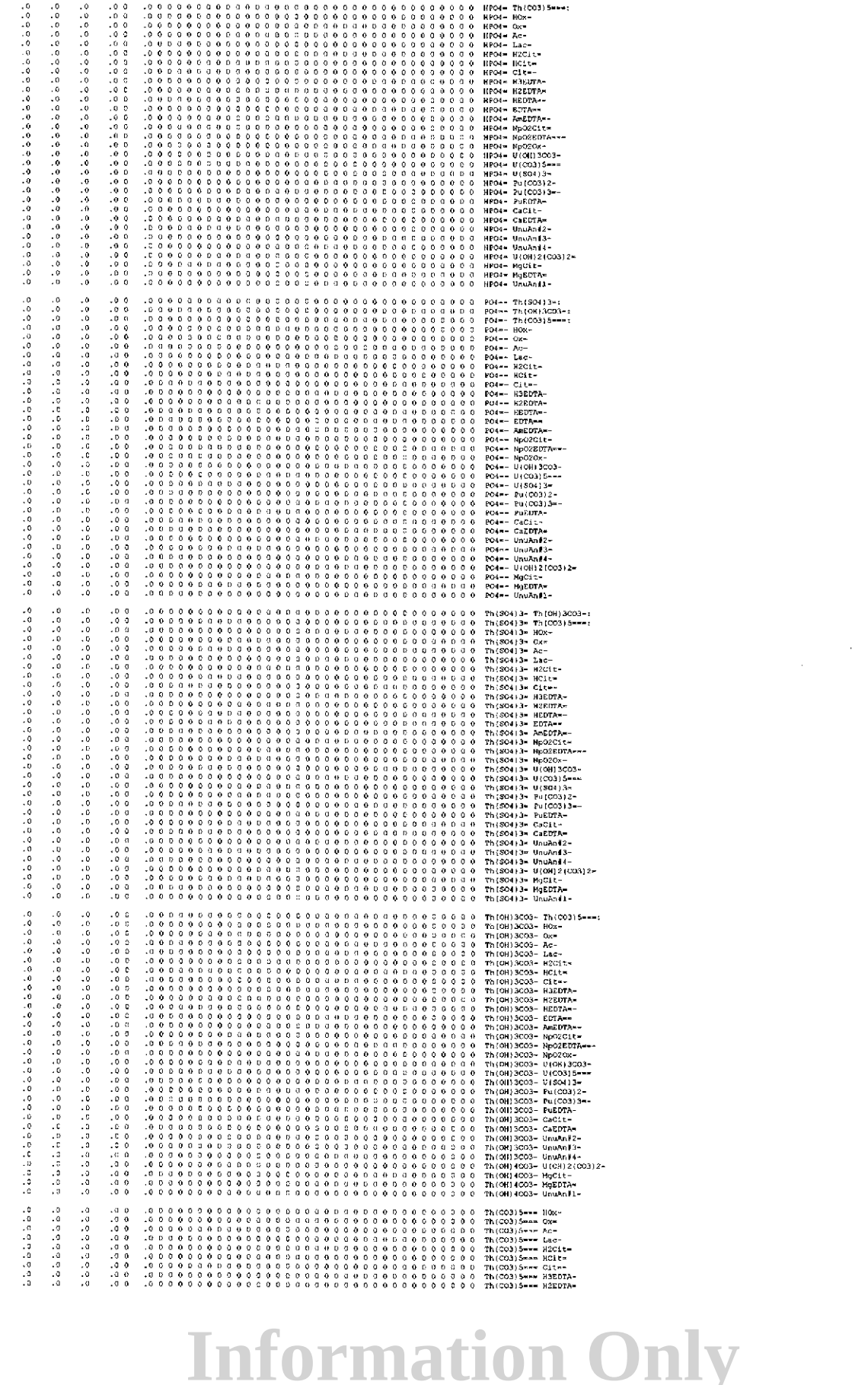


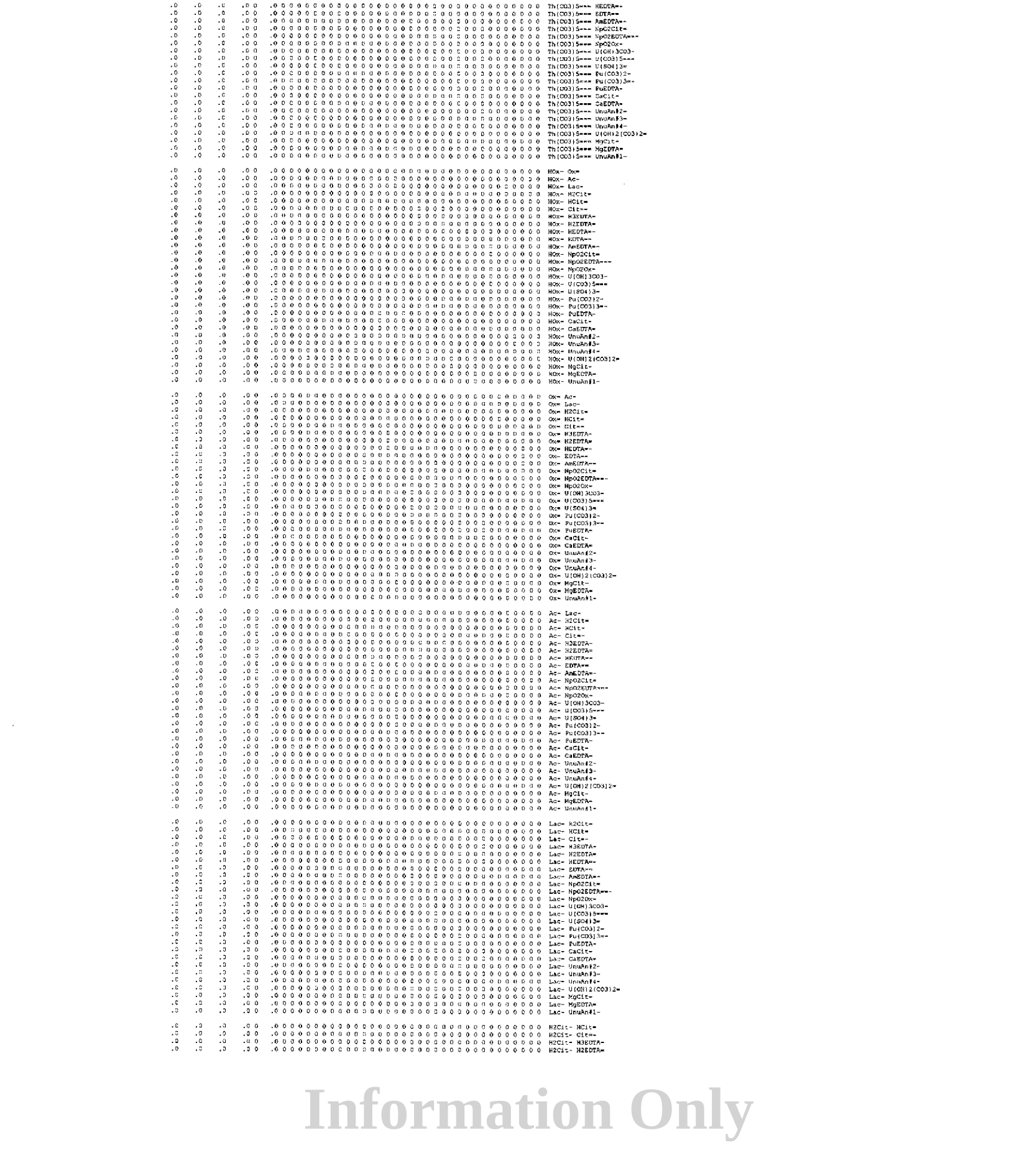


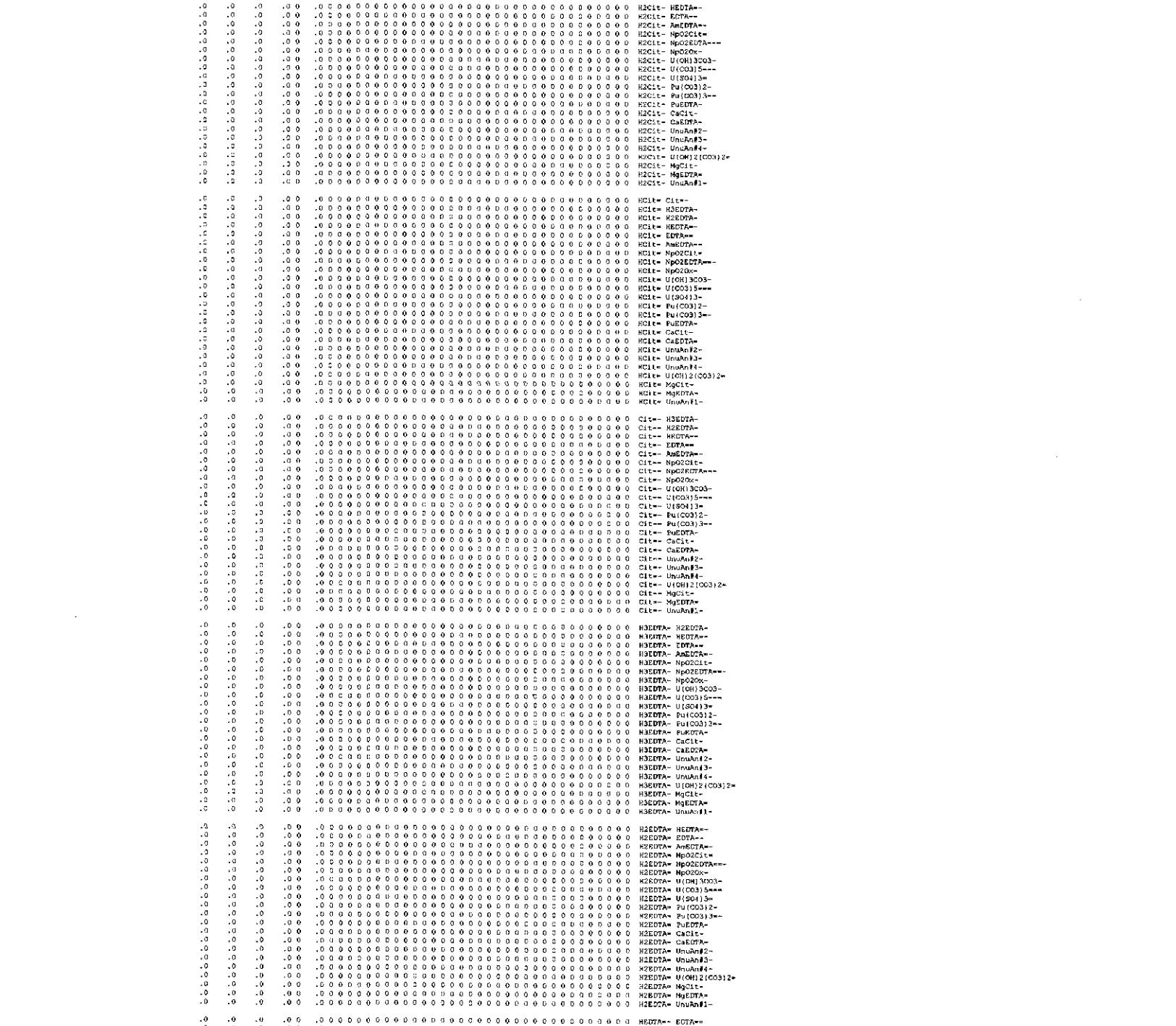


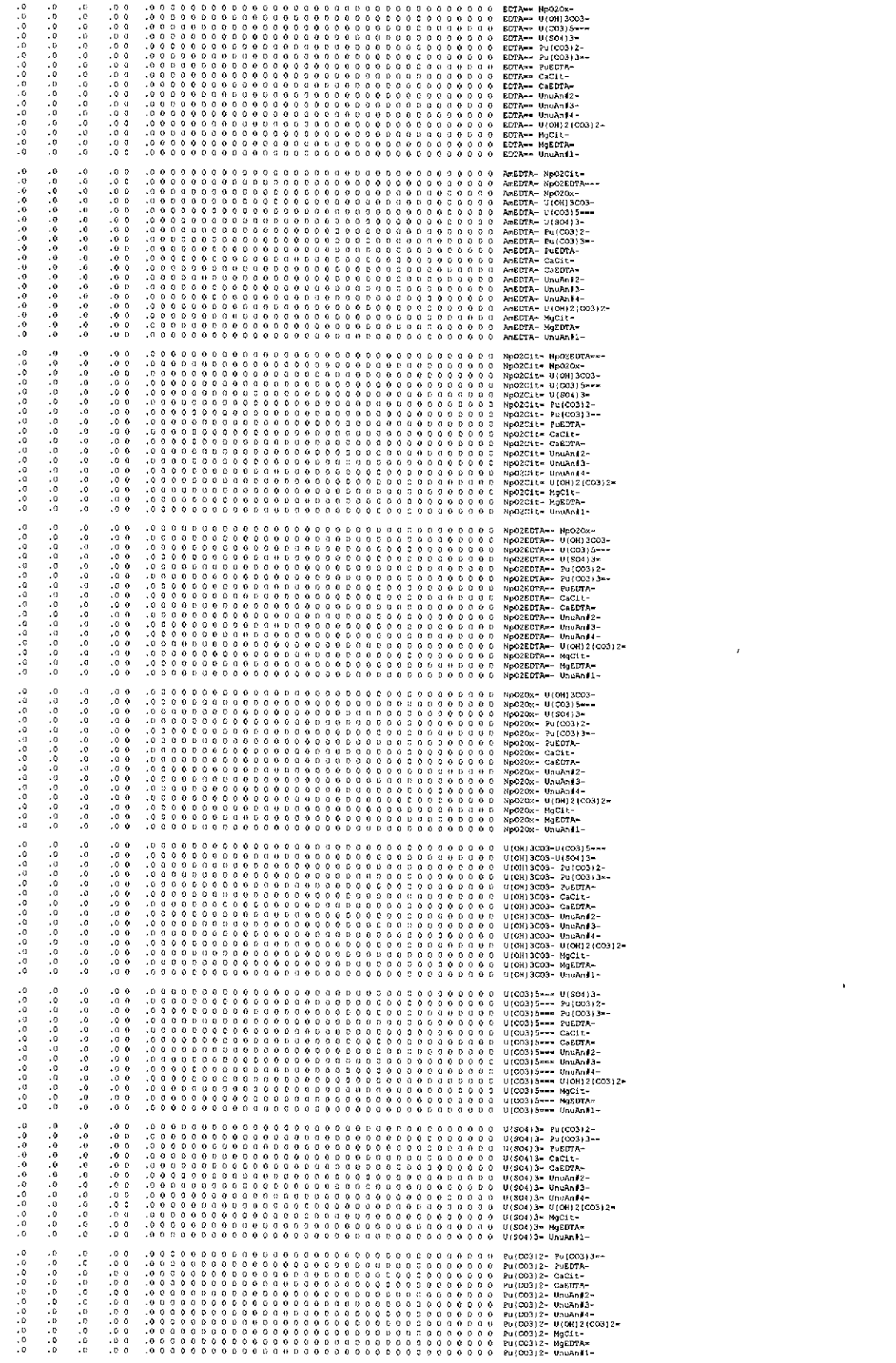


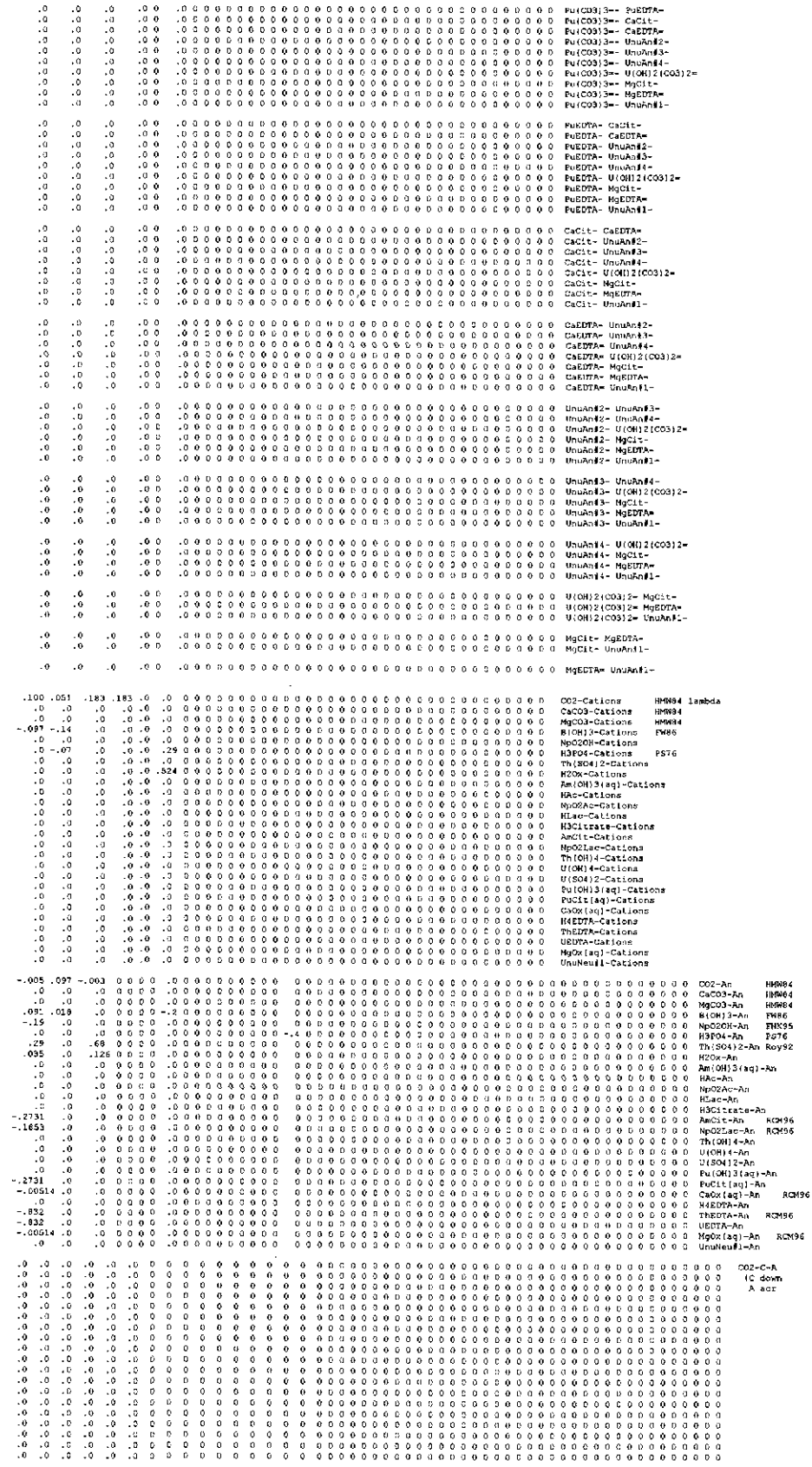


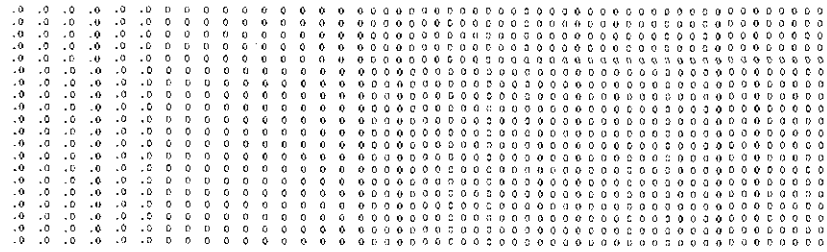




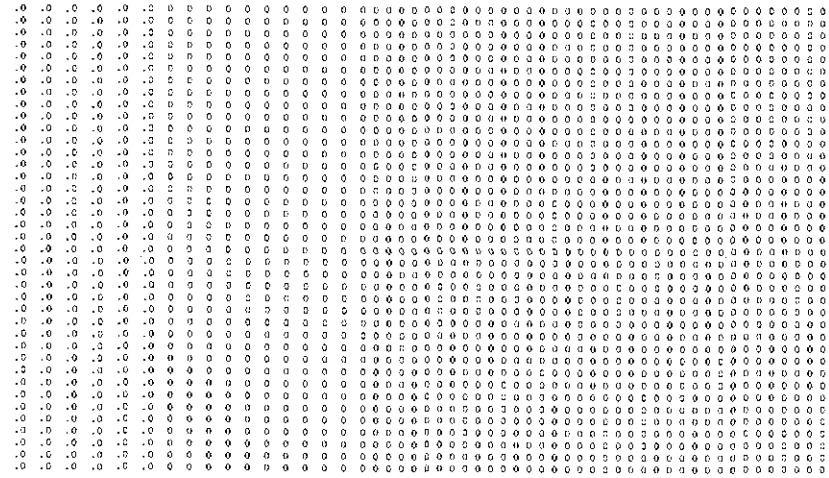




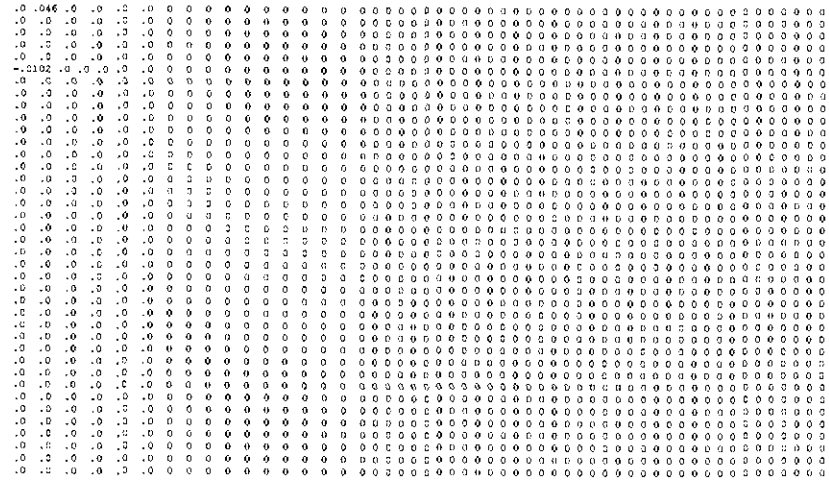




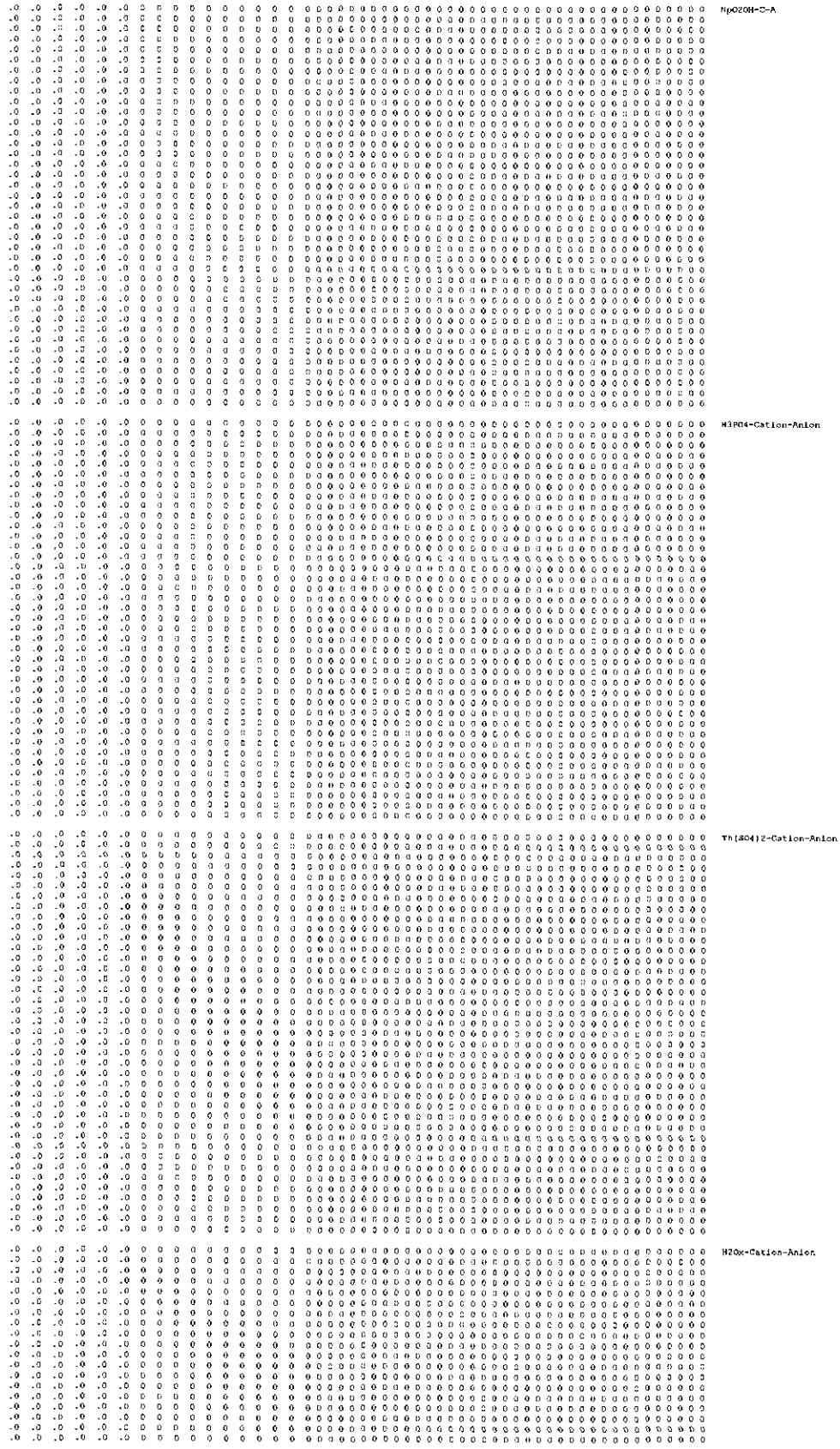
CaCO3-Cation-Anion

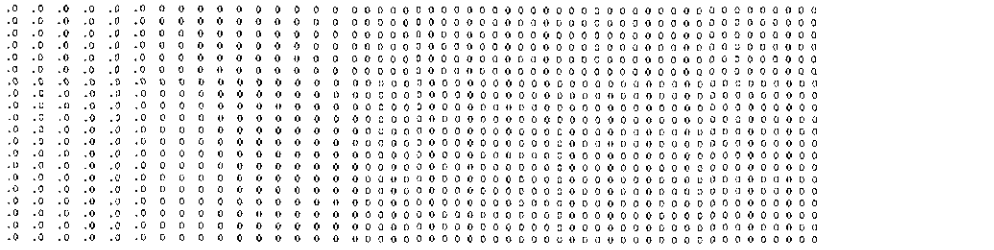


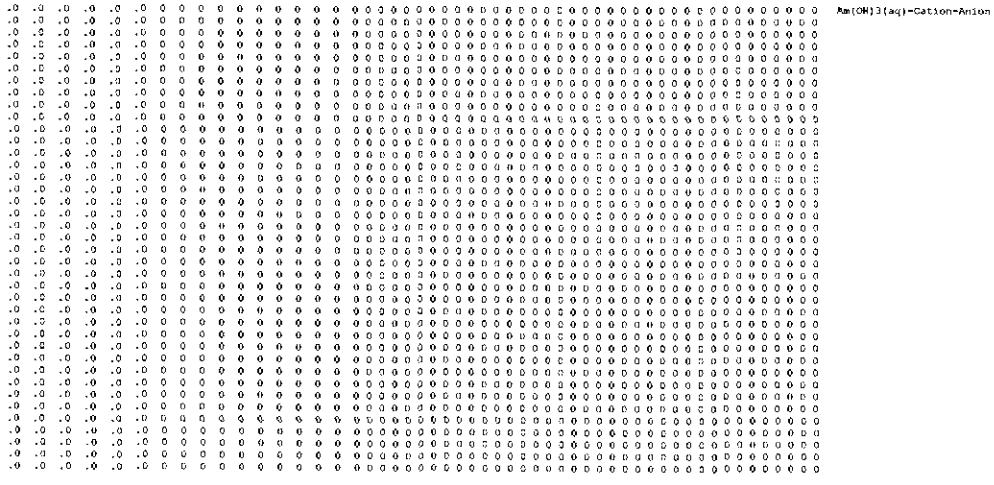
MgCO3-Cation-Anion

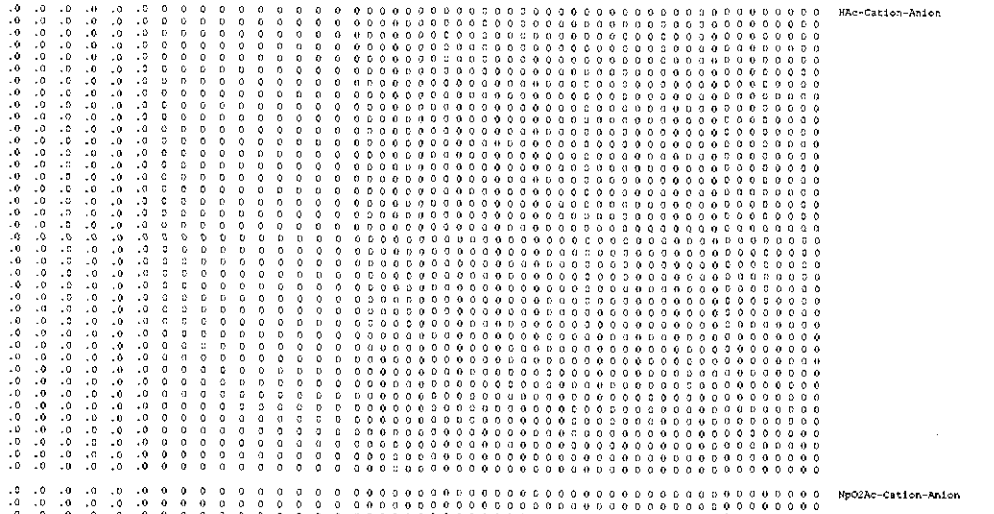


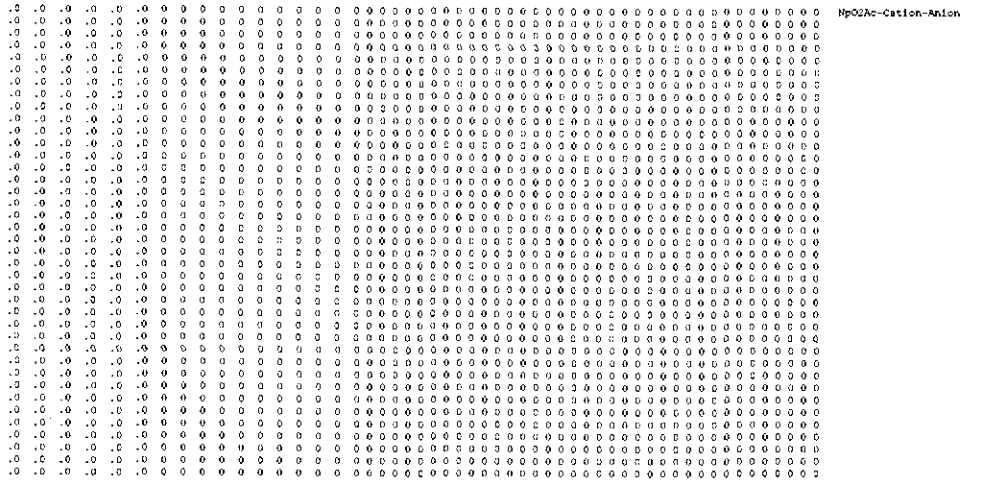
B(OH)3-Cation-Anion FW86
(Cat down, Anions across)

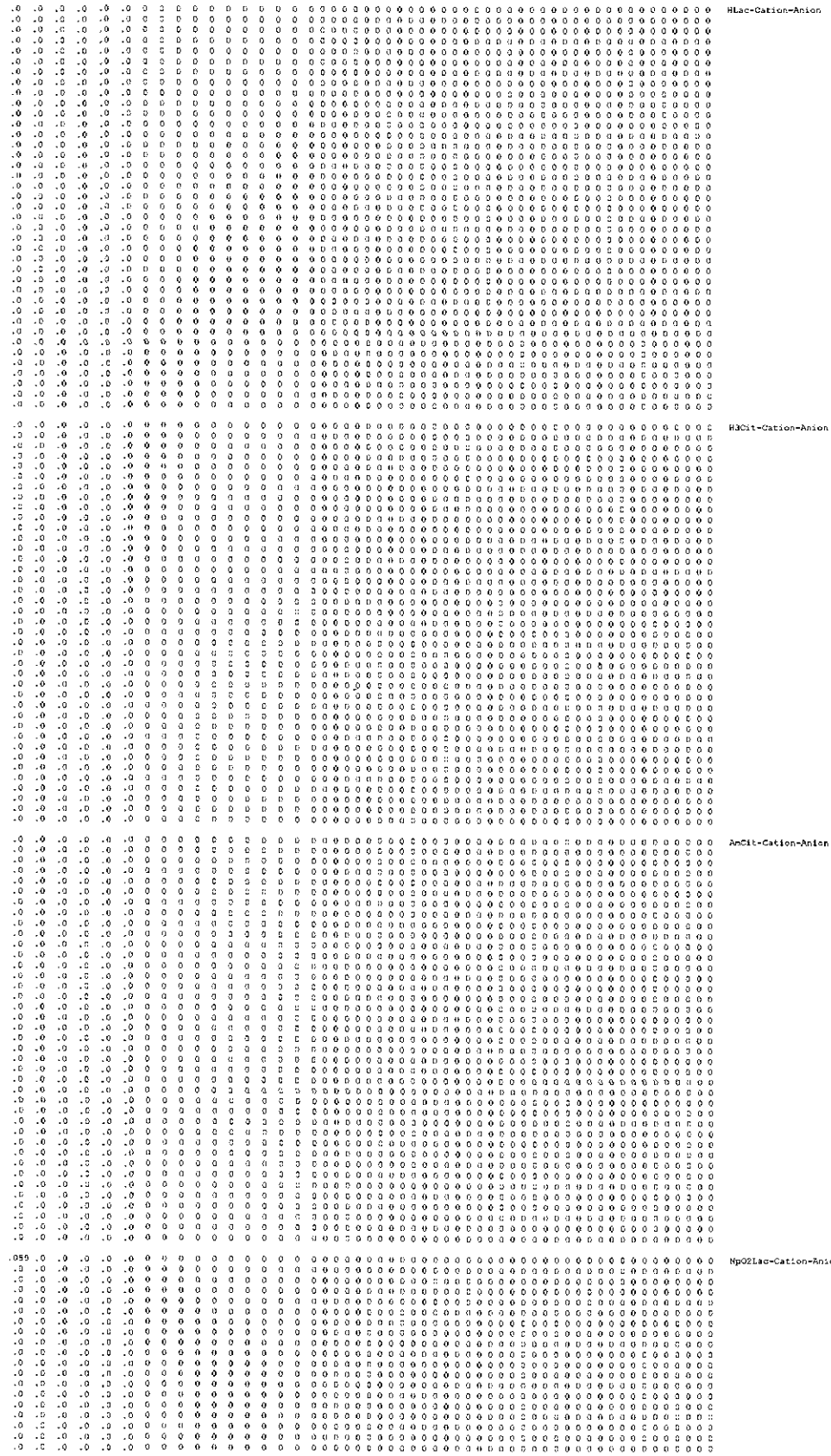


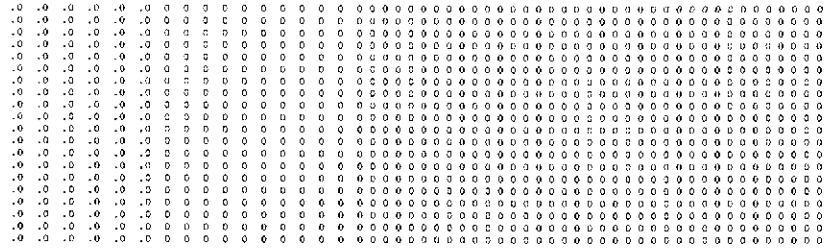


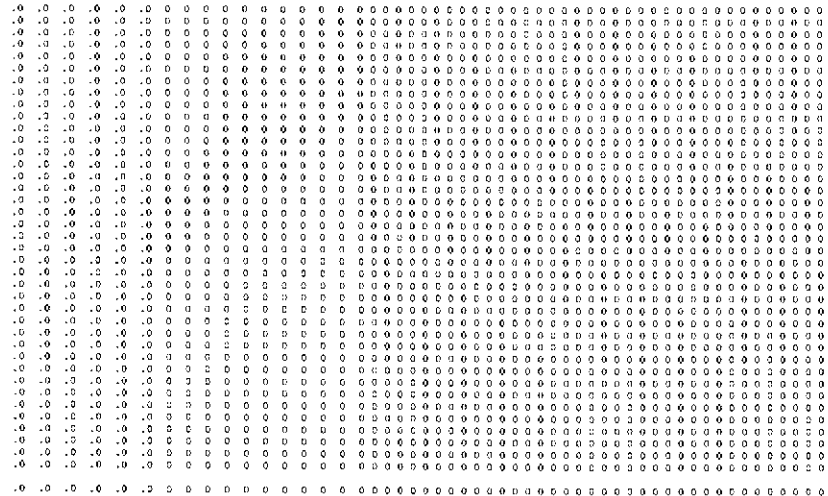


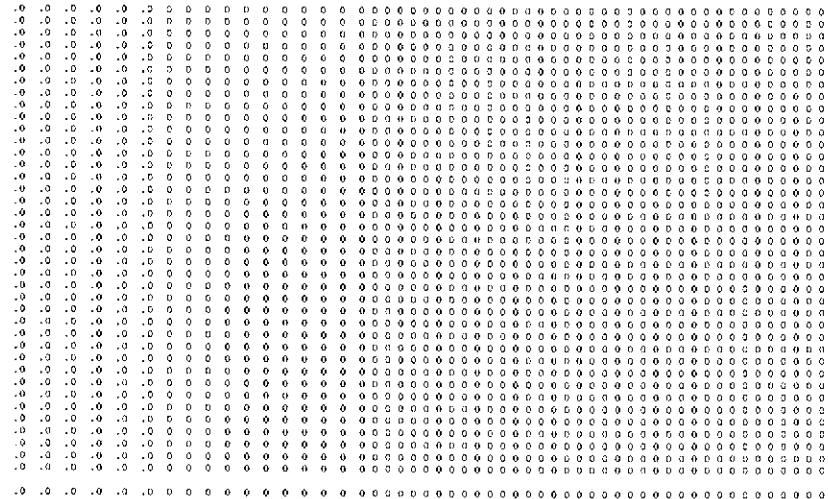


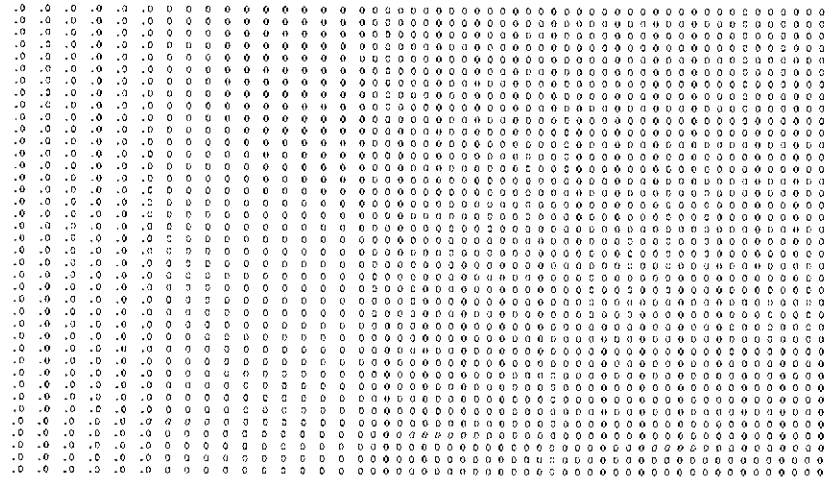


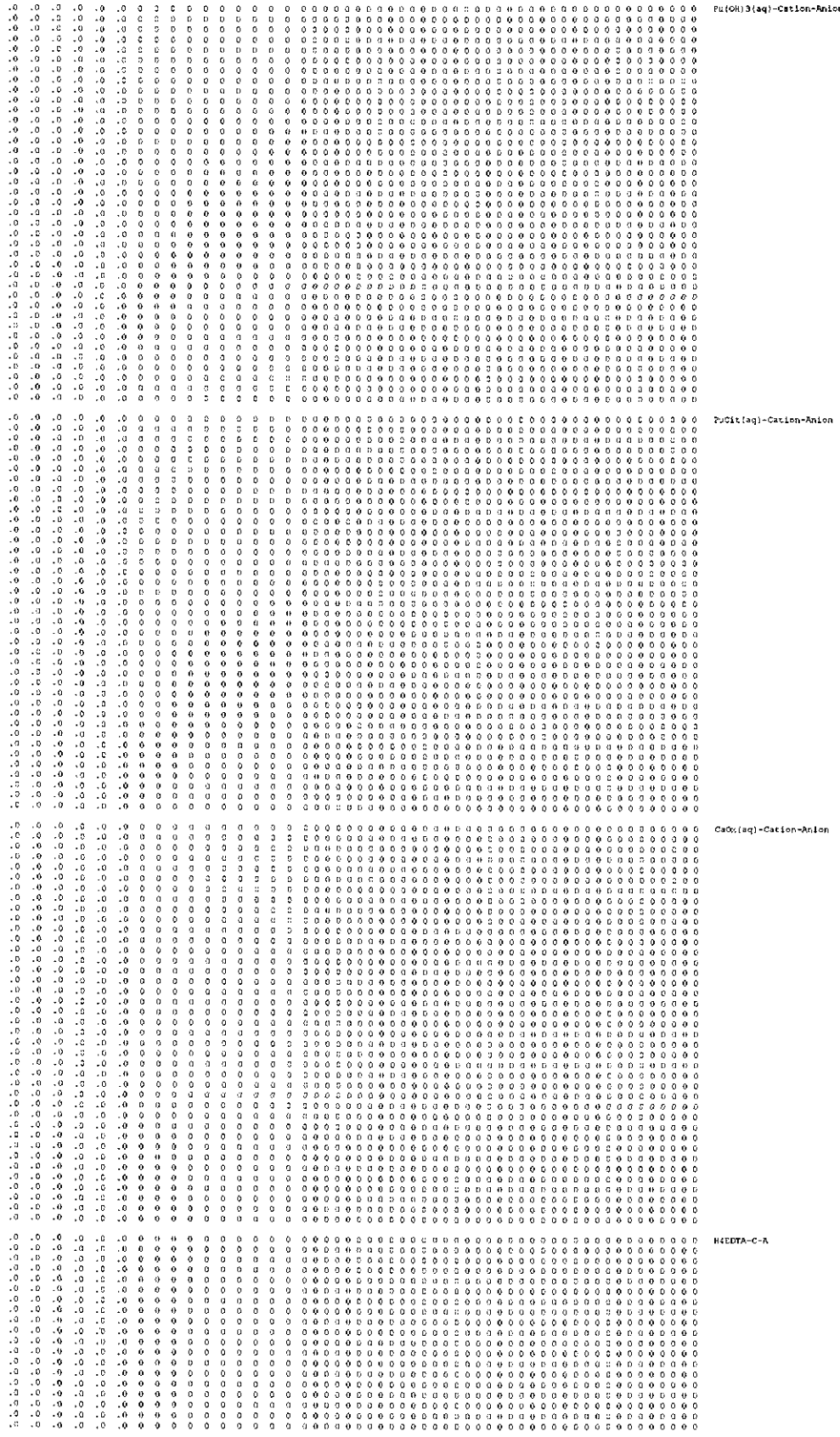


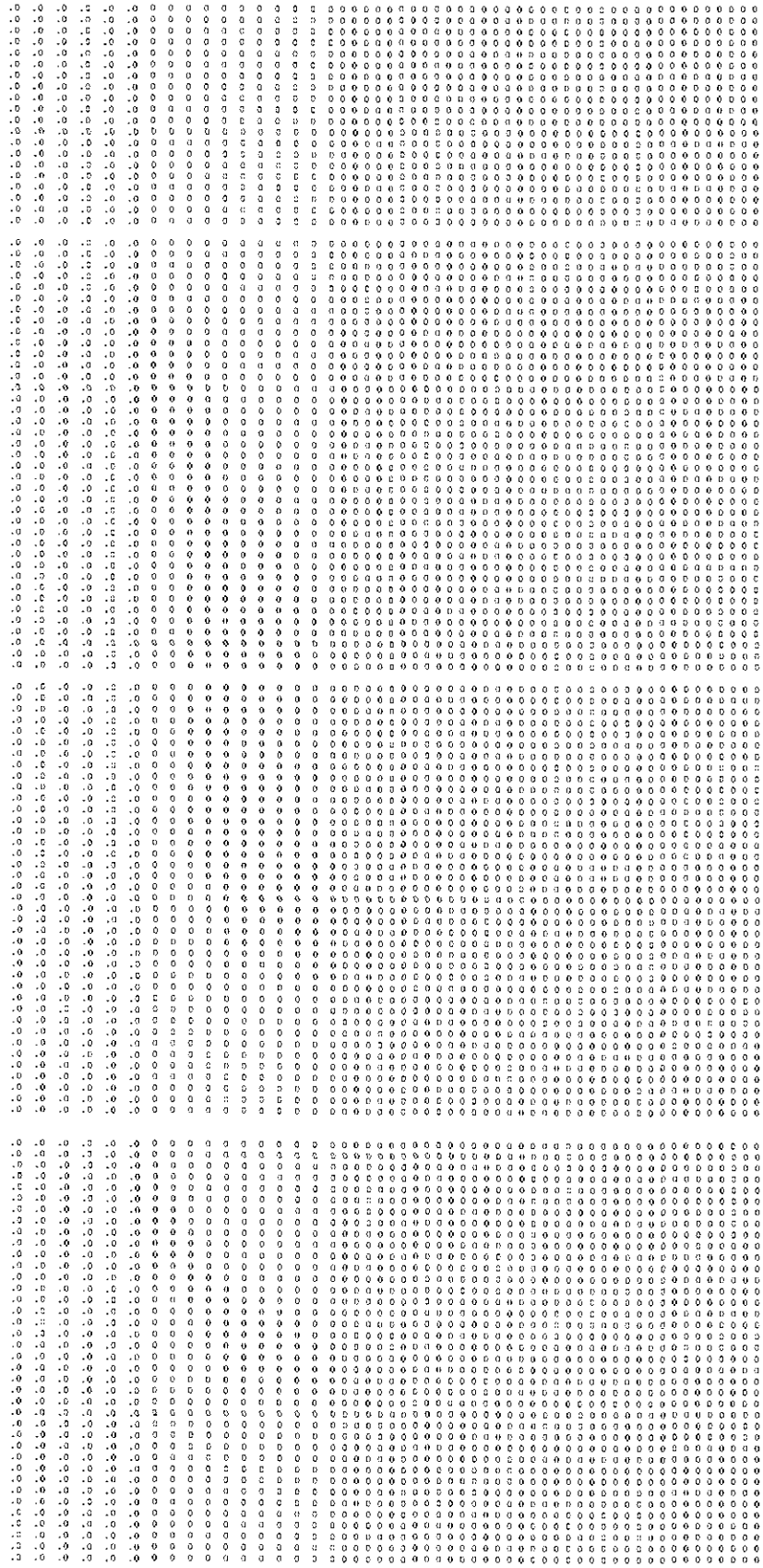


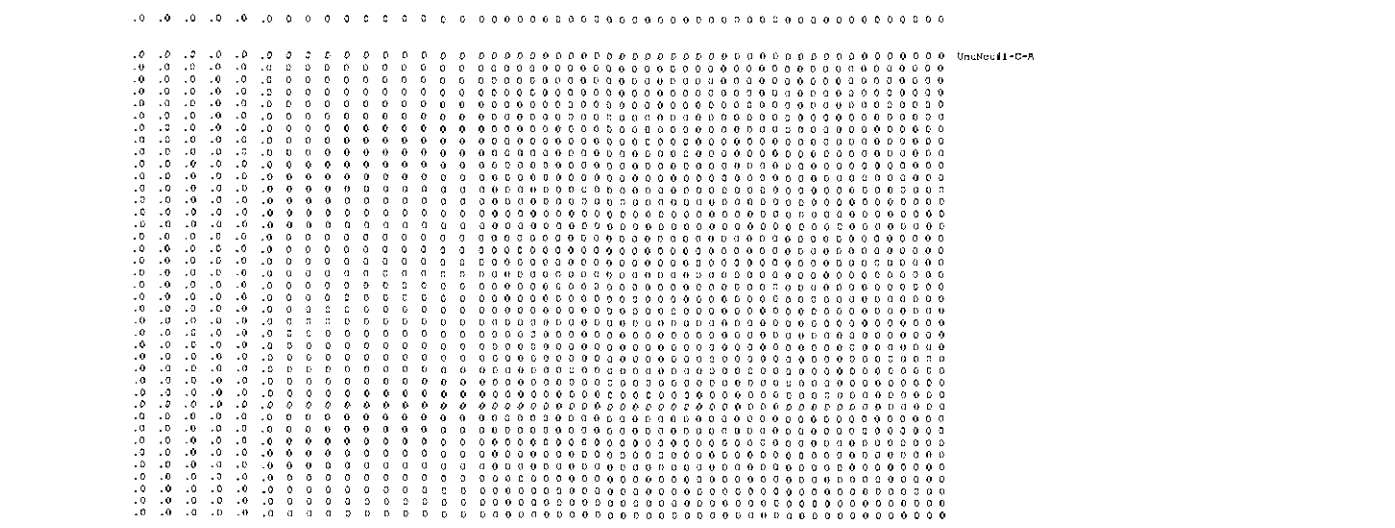












```
  2   3   4   5   6   7      Na+       K+        Ca++      Mg++      MgOH+  H+              cation map ELMAP(1,)
 22  21  36  39  50  43      MgB(OH)4+ CaB(OH)4+ Am+++     AmCO3+    Th++++ Pu+++
 64  96  87 101  98  86      NpO2+     U++++     UOH+++    UAc+++    ThOx++ AmAc++
 90  98 102 104 105  96      AmLac++   AmOx+     UCit+     ULac+++   UOx++  ThAc+++
 97 100  40  41  44  47      ThCit+    ThLac++&  AmOH++    Am(OH)2+  PuCO3+ PuOH++
 48  91  94  95 115 120      Pu(OH)2+  PuAc++    PuOx+     PuLac++   CaAc+  CaLac+
111 115 121                  MgAc+     MgLac+    UnuCat#1+

  8   9  10  11  12  13      Cl-       SO4=      HSO4-     OH-       HCO3-     CO3=      anion map ELMAP(2,)
 15  19  20  23  38  38      B(OH)4-   B3O3(OH)4-  B4O5(OH)4=  Ox-     Am(CO3)2-   Am(CO3)3=-
 24  69  65  66  67  33      ClO4-     NpO2(OH)2-  NpO2CO3-   NpO2(CO3)2=-  NpO2(CO3)3=-- H2PO4-
 34  35  55  52  51  82      H2O4=     PO4=-     Th(SO4)3-   Th(OH)3(CO3)- Th(CO3)5---  HOx=
 83  71  85  73  74  75      Ox=       Ac=       Lac=      H2Cit-    HCit=     Cit=-
 77  78  79  80  88 107      H3EDTA-   H2EDTA=   HEDTA=-   EDTA=-    AmEDTA=-  NpO2Cit=
108 109  60  58  63  45      NpO2EDTA=-  NpO2Ox-   U(OH)4(CO3)2=- U(CO3)5===  U(SO4)3=  Pu(CO3)2-
 46  93 117 118 123 124      Pu(CO3)3-- PuEDTA-   CaCit-     CaHEDTA-  UnuAn#2-   UnuAn#3-
125  59 112 113 122          UnuAn#4-  U(OH)2(CO3)2= MgCit-     MgEDTA=   UnuAn#1-

 14  15  16  17  68  32      CO2       CaCO3     MgCO3     B(OH)3  NpO2OH H3PO4    neutral map ELMAP(3,)
 54  81  42  70 106  94      Th(SO4)2  HZOx      Am(OH)3(aq) HAc     NpO2Ac HLac
 72  87 110  53  61  62      H3Cit     AmCit     NpO2Lac   Th(OH)4 U(OH)4 U(SO4)2
 49  92 119  76  98 103      Pu(OH)3(aq) PuCit(aq) CaOx(aq)  H4EDTA  ThEDTA UEDTA
114 126                      MgOx(aq)  UnuNeu#1

'nEQUALACT' 0

2 (Oxygen)
'nREDOX' 0
'nIONEX' 0 0 'nME'

1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012
          1         2         3         4         5         6         7         8         9         0         :         2         3
                                                                                                        1         1         1         1

Data values without explicit references are from HMW84 or FW86

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