

Supporting Information

Prediction on adsorption behaviors of radionuclides onto bentonites by using a machine learning method

Do-Hyeon Kim and Jun-Yeop Lee*

School of Mechanical Engineering, Pusan National University
2, Busandaehak-ro 63beon-gil, Geumjeong-gu, Busan 46241, Korea

*jylee@pusan.ac.kr

Table S1. Input variable database for the random forest model calculation. The data are taken from the JAEA-SDB [1], otherwise stated.

No.	Element	Redox ^{a)}	IR ^{b)} (Å) [2]	EN ^{c)} [3]	CEC ^{d)} (meq/100 g)	SA ^{e)} (m ² /g)	LS ^{f)} (mL/g)	Ionic S ^{g)} (mol/L)	pH	C ₀ ^{h)} (mol/L)	K _d (m ³ /kg)
1	Co	2	0.745	1.7	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	4.4	1.00E-06	3.98E-02
2	Co	2	0.745	1.7	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	2.6	1.00E-06	6.31E-02
3	Co	2	0.745	1.7	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	3	1.00E-06	6.31E-02
4	Co	2	0.745	1.7	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	3.3	1.00E-06	7.94E-02
5	Co	2	0.745	1.7	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	5	1.00E-06	1.00E-01
6	Co	2	0.745	1.7	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	6	1.00E-06	1.58E-01
7	Co	2	0.745	1.7	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	7.3	1.00E-06	6.31E-01
8	Co	2	0.745	1.7	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	6.9	1.00E-06	1.58E+00
9	Co	2	0.745	1.7	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	7.6	1.00E-06	2.51E+00
10	Na	1	1.02	1.01	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	7.2	1.00E-06	3.98E-03
11	Na	1	1.02	1.01	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	4.3	1.00E-06	5.01E-03
12	Na	1	1.02	1.01	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	5	1.00E-06	5.01E-03
13	Na	1	1.02	1.01	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	5.8	1.00E-06	5.01E-03
14	Na	1	1.02	1.01	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	8	1.00E-06	5.01E-03
15	Na	1	1.02	1.01	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	9	1.00E-06	5.01E-03
16	Sr	2	1.18	0.99	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	3.9	1.00E-06	1.58E-02
17	Sr	2	1.18	0.99	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	4.3	1.00E-06	2.51E-02
18	Sr	2	1.18	0.99	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	5.5	1.00E-06	2.51E-02
19	Sr	2	1.18	0.99	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	7.1	1.00E-06	3.16E-02
20	Sr	2	1.18	0.99	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	8.1	1.00E-06	6.31E-02
21	Sr	2	1.18	0.99	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	8.9	1.00E-06	6.31E-02
22	Sr	2	1.18	0.99	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	9.7	1.00E-06	7.94E-02
23	Am	3	0.975	1.2	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	22.5	0.0085 ^{j)} [6,7]	8.2	1.00E-09	6.60E+00
24	Cs	1	1.67	0.86	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	22.5	0.0085 ^{j)} [6,7]	8.2	1.00E-10	1.40E+00
25	Np	5	0.75	1.22	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	22.5	0.0085 ^{j)} [6,7]	8.2	1.00E-09	1.20E-01
26	Pu	4	0.86	1.22	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	22.5	0.0085 ^{j)} [6,7]	8.2	1.00E-09	3.50E+00
27	Sr	2	1.18	0.99	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	22.5	0.0085 ^{j)} [6,7]	8.2	1.00E-11	2.90E+00
28	Th	4	0.94	1.11	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	22.5	0.0085 ^{j)} [6,7]	8.2	1.00E-14	6.00E+00
29	U	6	0.89	1.22	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	22.5	0.0085 ^{j)} [6,7]	8.2	1.00E-08	9.30E-02
30	Pa	5	0.78	1.14	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	22.5	0.0085 ^{j)} [6,7]	8.2	1.00E-13	5.00E+00
31	Co	2	0.745	1.7	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	8	1.00E-06	7.94E+00
32	Co	2	0.745	1.7	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	8.4	1.00E-06	1.00E+01
33	Co	2	0.745	1.7	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	9	1.00E-06	3.98E+01
34	Co	2	0.745	1.7	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	9.5	1.00E-06	1.00E+02
35	Cs	1	1.67	0.86	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	4.9	1.00E-06	1.00E-01
36	Cs	1	1.67	0.86	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	9.2	1.00E-06	1.26E-01
37	Cs	1	1.67	0.86	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	4	1.00E-06	1.58E-01
38	Cs	1	1.67	0.86	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	8	1.00E-06	1.58E-01
39	Cs	1	1.67	0.86	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	5.8	1.00E-06	2.00E-01
40	Cs	1	1.67	0.86	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	9.9	1.00E-06	2.00E-01
41	Cs	1	1.67	0.86	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	200	0.1	6.9	1.00E-06	2.51E-01
42	Cs	1	1.67	0.86	78 ⁱ⁾ [4]	760 ⁱ⁾ [4]	100	0.1	9.13	1.00E-01	1.00E-02

43	Cs	1	1.67	0.86	78 ⁱ) [4]	760 ⁱ) [4]	100	0.1	9.11	3.00E-02	3.00E-02
44	Cs	1	1.67	0.86	78 ⁱ) [4]	760 ⁱ) [4]	100	0.1	9.12	1.00E-02	7.20E-02
45	Cs	1	1.67	0.86	78 ⁱ) [4]	760 ⁱ) [4]	100	0.1	9.14	3.00E-03	1.24E-01
46	Cs	1	1.67	0.86	78 ⁱ) [4]	760 ⁱ) [4]	100	0.1	9.16	1.00E-03	1.33E-01
47	Cs	1	1.67	0.86	78 ⁱ) [4]	760 ⁱ) [4]	100	0.1	9.18	3.00E-04	1.33E-01
48	Cs	1	1.67	0.86	78 ⁱ) [4]	760 ⁱ) [4]	100	0.1	9.18	1.00E-04	1.40E-01
49	Cs	1	1.67	0.86	78 ⁱ) [4]	760 ⁱ) [4]	100	0.1	9.18	3.00E-05	1.52E-01
50	Cs	1	1.67	0.86	78 ⁱ) [4]	760 ⁱ) [4]	100	0.1	9.18	1.00E-05	1.58E-01
51	Cs	1	1.67	0.86	78 ⁱ) [4]	760 ⁱ) [4]	100	0.1	9.18	3.00E-06	1.67E-01
52	Cs	1	1.67	0.86	78 ⁱ) [4]	760 ⁱ) [4]	100	0.1	9.18	1.00E-06	1.88E-01
53	Cs	1	1.67	0.86	78 ⁱ) [4]	760 ⁱ) [4]	100	0.1	9.18	3.00E-07	2.00E-01
54	Cs	1	1.67	0.86	78 ⁱ) [4]	760 ⁱ) [4]	100	0.1	9.18	1.00E-07	2.22E-01
55	Cs	1	1.67	0.86	78 ⁱ) [4]	760 ⁱ) [4]	100	0.1	9.18	3.00E-08	2.24E-01
56	Cs	1	1.67	0.86	78 ⁱ) [4]	760 ⁱ) [4]	100	0.1	9.18	1.00E-08	2.31E-01
57	Sr	2	1.18	0.99	78 ⁱ) [4]	760 ⁱ) [4]	200	0.1	7.9	1.00E-06	3.70E-02
58	Sr	2	1.18	0.99	78 ⁱ) [4]	760 ⁱ) [4]	20	0.1	8.2	1.00E-06	4.10E-02
59	Sr	2	1.18	0.99	78 ⁱ) [4]	760 ⁱ) [4]	200	0.1	7.7	1.00E-06	4.50E-02
60	Sr	2	1.18	0.99	78 ⁱ) [4]	760 ⁱ) [4]	20	0.1	8.2	1.00E-06	4.80E-02
61	Sr	2	1.18	0.99	78 ⁱ) [4]	760 ⁱ) [4]	20	0.01	8.7	1.00E-06	2.00E-01
62	Sr	2	1.18	0.99	78 ⁱ) [4]	760 ⁱ) [4]	20	0.01	8.9	1.00E-06	3.00E-01
63	Sr	2	1.18	0.99	78 ⁱ) [4]	760 ⁱ) [4]	200	0.01	7.8	1.00E-06	5.00E-01
64	Sr	2	1.18	0.99	78 ⁱ) [4]	760 ⁱ) [4]	200	0.01	8	1.00E-06	1.80E+00
65	Cd	2	0.95	1.46	76.4 ⁱ) [5]	31.82 ⁱ) [5]	2000	0.001	3.73	5.00E-05	2.17E+00
66	Cd	2	0.95	1.46	76.4 ⁱ) [5]	31.82 ⁱ) [5]	2000	0.001	4.01	5.00E-05	2.28E+00
67	Cd	2	0.95	1.46	76.4 ⁱ) [5]	31.82 ⁱ) [5]	2000	0.001	4.36	5.00E-05	2.47E+00
68	Cd	2	0.95	1.46	76.4 ⁱ) [5]	31.82 ⁱ) [5]	2000	0.001	4.68	5.00E-05	2.55E+00
69	Cd	2	0.95	1.46	76.4 ⁱ) [5]	31.82 ⁱ) [5]	2000	0.001	5.08	5.00E-05	2.62E+00
70	Cd	2	0.95	1.46	76.4 ⁱ) [5]	31.82 ⁱ) [5]	2000	0.001	5.62	5.00E-05	2.86E+00
71	Cd	2	0.95	1.46	76.4 ⁱ) [5]	31.82 ⁱ) [5]	2000	0.001	6.14	5.00E-05	3.68E+00
72	Cd	2	0.95	1.46	76.4 ⁱ) [5]	31.82 ⁱ) [5]	2000	0.001	6.79	5.00E-05	3.55E+00
73	Cd	2	0.95	1.46	76.4 ⁱ) [5]	31.82 ⁱ) [5]	2000	0.001	7.3	5.00E-05	3.86E+00
74	Cd	2	0.95	1.46	76.4 ⁱ) [5]	31.82 ⁱ) [5]	2000	0.001	7.51	5.00E-05	4.21E+00
75	Cd	2	0.95	1.46	76.4 ⁱ) [5]	31.82 ⁱ) [5]	2000	0.001	8	5.00E-05	8.25E+00
76	Cd	2	0.95	1.46	76.4 ⁱ) [5]	31.82 ⁱ) [5]	2000	0.001	8.43	5.00E-05	1.23E+01
77	Cd	2	0.95	1.46	76.4 ⁱ) [5]	31.82 ⁱ) [5]	2000	0.001	9.38	5.00E-05	9.19E+01
78	Cd	2	0.95	1.46	76.4 ⁱ) [5]	31.82 ⁱ) [5]	2000	0.02	3.01	5.00E-05	3.95E-01
79	Cd	2	0.95	1.46	76.4 ⁱ) [5]	31.82 ⁱ) [5]	2000	0.02	3.54	5.00E-05	5.03E-01
80	Cd	2	0.95	1.46	76.4 ⁱ) [5]	31.82 ⁱ) [5]	2000	0.02	4.22	5.00E-05	5.31E-01
81	Cd	2	0.95	1.46	76.4 ⁱ) [5]	31.82 ⁱ) [5]	2000	0.02	4.44	5.00E-05	5.93E-01
82	Cd	2	0.95	1.46	76.4 ⁱ) [5]	31.82 ⁱ) [5]	2000	0.02	4.75	5.00E-05	7.60E-01
83	Cd	2	0.95	1.46	76.4 ⁱ) [5]	31.82 ⁱ) [5]	2000	0.02	5.31	5.00E-05	6.01E-01
84	Cd	2	0.95	1.46	76.4 ⁱ) [5]	31.82 ⁱ) [5]	2000	0.02	5.61	5.00E-05	5.66E-01
85	Cd	2	0.95	1.46	76.4 ⁱ) [5]	31.82 ⁱ) [5]	2000	0.02	5.97	5.00E-05	5.60E-01
86	Cd	2	0.95	1.46	76.4 ⁱ) [5]	31.82 ⁱ) [5]	2000	0.02	6.73	5.00E-05	6.91E-01
87	Cd	2	0.95	1.46	76.4 ⁱ) [5]	31.82 ⁱ) [5]	2000	0.02	7.26	5.00E-05	9.62E-01

88	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	7.7	5.00E-05	1.32E+00
89	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	8.11	5.00E-05	1.94E+00
90	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	8.58	5.00E-05	3.80E+00
91	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	8.97	5.00E-05	8.86E+00
92	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	9.69	5.00E-05	2.29E+01
93	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	3.54	5.00E-05	4.80E-02
94	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.07	5.00E-05	6.62E-02
95	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.44	5.00E-05	7.10E-02
96	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.75	5.00E-05	5.30E-03
97	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.18	5.00E-05	2.70E-02
98	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.57	5.00E-05	4.48E-02
99	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.03	5.00E-05	1.33E-01
100	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.29	5.00E-05	9.05E-02
101	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.88	5.00E-05	2.18E-01
102	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	7.22	5.00E-05	1.73E-01
103	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	8.03	5.00E-05	4.36E-01
104	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	8.7	5.00E-05	1.33E+00
105	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	9.3	5.00E-05	5.05E+00
106	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	9.94	5.00E-05	1.66E+01
107	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	3.03	5.00E-06	8.58E-01
108	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	3.7	5.00E-06	8.94E-01
109	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	4.3	5.00E-06	9.86E-01
110	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	4.6	5.00E-06	1.04E+00
111	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	5.29	5.00E-06	1.20E+00
112	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	5.82	5.00E-06	1.38E+00
113	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	5.98	5.00E-06	1.45E+00
114	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.29	5.00E-06	1.92E+00
115	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.58	5.00E-06	1.69E+00
116	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.8	5.00E-06	2.67E+00
117	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.96	5.00E-06	2.67E+00
118	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	7.37	5.00E-06	2.92E+00
119	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	8.33	5.00E-06	9.94E+00
120	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	8.96	5.00E-06	3.56E+01
121	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	9.66	5.00E-06	9.07E+02
122	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	3.12	5.00E-06	4.31E-03
123	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.88	5.00E-06	1.51E-01
124	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.79	5.00E-06	9.94E-02
125	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.07	5.00E-06	1.67E-01
126	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.35	5.00E-06	1.19E-01
127	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.75	5.00E-06	5.33E-01
128	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.94	5.00E-06	6.47E-01
129	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	7.58	5.00E-06	1.30E+00
130	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	7.91	5.00E-06	1.76E+00
131	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	9.27	5.00E-06	3.05E+01
132	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	9.9	5.00E-06	2.22E+01

133	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	3.1	5.00E-07	8.38E-02
134	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	3.62	5.00E-07	7.04E-02
135	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.1	5.00E-07	1.91E-01
136	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.76	5.00E-07	3.78E-01
137	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.03	5.00E-07	1.04E-01
138	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.53	5.00E-07	1.57E-01
139	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.97	5.00E-07	4.28E-01
140	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.26	5.00E-07	6.39E-01
141	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.64	5.00E-07	1.20E+00
142	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.95	5.00E-07	1.33E+00
143	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.99	5.00E-07	1.93E+00
144	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	7.43	5.00E-07	2.79E+00
145	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	8.14	5.00E-07	4.65E+00
146	Cd	2	0.95	1.46	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	8.66	5.00E-07	1.14E+02
147	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	3.2	5.00E-05	2.03E+00
148	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	3.64	5.00E-05	2.14E+00
149	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	4.29	5.00E-05	2.25E+00
150	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	4.55	5.00E-05	2.12E+00
151	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	4.82	5.00E-05	2.55E+00
152	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	5.19	5.00E-05	3.44E+00
153	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	5.88	5.00E-05	3.73E+00
154	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	6.23	5.00E-05	3.80E+00
155	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	6.58	5.00E-05	3.00E+00
156	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	6.94	5.00E-05	2.92E+00
157	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	7.64	5.00E-05	3.43E+00
158	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	8	5.00E-05	4.64E+00
159	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	9.1	5.00E-05	1.03E+01
160	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	9.85	5.00E-05	1.88E+02
161	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	3.64	5.00E-05	5.27E-01
162	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	4.06	5.00E-05	5.75E-01
163	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	4.47	5.00E-05	6.10E-01
164	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	4.78	5.00E-05	6.61E-01
165	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	5.31	5.00E-05	6.68E-01
166	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	5.75	5.00E-05	6.75E-01
167	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.17	5.00E-05	7.44E-01
168	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.42	5.00E-05	6.67E-01
169	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.68	5.00E-05	6.82E-01
170	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	7.02	5.00E-05	6.51E-01
171	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	7.3	5.00E-05	6.51E-01
172	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	7.96	5.00E-05	9.47E-01
173	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	8.61	5.00E-05	5.08E+00
174	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	9.79	5.00E-05	1.46E+01
175	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	3.54	5.00E-05	4.28E-02
176	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	3.94	5.00E-05	8.75E-02
177	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.47	5.00E-05	9.17E-02

178	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.93	5.00E-05	1.10E-01
179	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.18	5.00E-05	1.15E-01
180	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.96	5.00E-05	1.14E-01
181	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.09	5.00E-05	6.34E-02
182	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.88	5.00E-05	1.42E-01
183	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	7.4	5.00E-05	1.47E-01
184	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	7.78	5.00E-05	2.11E-01
185	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	8.51	5.00E-05	1.99E+00
186	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	9.82	5.00E-05	1.34E+02
187	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	3.05	5.00E-06	7.16E-01
188	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	3.62	5.00E-06	8.04E-01
189	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	4.09	5.00E-06	9.24E-01
190	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	4.65	5.00E-06	1.03E+00
191	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	5.08	5.00E-06	1.16E+00
192	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	5.67	5.00E-06	1.33E+00
193	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.12	5.00E-06	1.30E+00
194	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.37	5.00E-06	1.67E+00
195	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.65	5.00E-06	1.75E+00
196	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.67	5.00E-06	1.24E+00
197	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	7.24	5.00E-06	2.22E+00
198	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	8.1	5.00E-06	3.46E+00
199	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	9.01	5.00E-06	1.18E+01
200	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	9.96	5.00E-06	1.16E+02
201	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	3.05	5.00E-06	7.44E-02
202	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	3.69	5.00E-06	6.49E-02
203	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.19	5.00E-06	1.15E-01
204	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.74	5.00E-06	1.48E-01
205	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.16	5.00E-06	2.99E-01
206	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.78	5.00E-06	2.23E-01
207	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.09	5.00E-06	3.79E-01
208	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.19	5.00E-06	3.50E-01
209	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.69	5.00E-06	4.98E-01
210	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.81	5.00E-06	4.78E-01
211	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.96	5.00E-06	6.15E-01
212	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	7.28	5.00E-06	6.81E-01
213	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	8.24	5.00E-06	1.49E+00
214	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	9.22	5.00E-06	2.12E+01
215	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.2	5.00E-07	6.54E-01
216	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.62	5.00E-07	8.03E-01
217	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.2	5.00E-07	1.02E+00
218	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.79	5.00E-07	1.49E+00
219	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.3	5.00E-07	2.11E+00
220	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.52	5.00E-07	2.55E+00
221	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.77	5.00E-07	3.19E+00
222	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.91	5.00E-07	4.06E+00

223	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	7.05	5.00E-07	4.42E+00
224	Co	2	0.745	1.7	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	7.41	5.00E-07	6.73E+00
225	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	3.06	5.00E-05	2.41E+00
226	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	3.66	5.00E-05	2.72E+00
227	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	4.11	5.00E-05	3.09E+00
228	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	4.53	5.00E-05	3.04E+00
229	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	4.66	5.00E-05	3.14E+00
230	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	5.31	5.00E-05	3.37E+00
231	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	5.71	5.00E-05	3.76E+00
232	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	6.16	5.00E-05	4.13E+00
233	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	6.39	5.00E-05	4.29E+00
234	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	6.57	5.00E-05	4.73E+00
235	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	6.8	5.00E-05	4.78E+00
236	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	7.25	5.00E-05	5.70E+00
237	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	7.61	5.00E-05	1.00E+01
238	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	8.78	5.00E-05	4.18E+01
239	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	9.71	5.00E-05	4.74E+02
240	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	3.06	5.00E-05	4.60E-01
241	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	3.54	5.00E-05	5.38E-01
242	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	4.18	5.00E-05	5.45E-01
243	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	4.37	5.00E-05	5.86E-01
244	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	4.73	5.00E-05	6.28E-01
245	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	5.68	5.00E-05	7.17E-01
246	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.04	5.00E-05	7.33E-01
247	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.46	5.00E-05	7.25E-01
248	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.74	5.00E-05	7.96E-01
249	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.93	5.00E-05	8.46E-01
250	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	7.24	5.00E-05	1.24E+00
251	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	8.01	5.00E-05	5.23E+00
252	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	9.03	5.00E-05	3.37E+01
253	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	9.8	5.00E-05	5.15E+01
254	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.11	5.00E-05	2.10E-02
255	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.5	5.00E-05	1.05E-01
256	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.81	5.00E-05	1.86E-01
257	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.24	5.00E-05	6.72E-01
258	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.65	5.00E-05	6.95E-01
259	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.2	5.00E-05	1.43E-01
260	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.35	5.00E-05	3.01E-01
261	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.54	5.00E-05	5.12E-01
262	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.92	5.00E-05	1.02E+00
263	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	7.29	5.00E-05	1.06E+00
264	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	7.56	5.00E-05	3.29E+00
265	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	8.92	5.00E-05	1.35E+02
266	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	9.8	5.00E-05	4.74E+02
267	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	3.06	5.00E-06	2.37E-01

268	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	3.73	5.00E-06	4.17E-01
269	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	4.27	5.00E-06	4.05E-01
270	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	5.04	5.00E-06	5.05E-01
271	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	5.36	5.00E-06	4.92E-01
272	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	5.93	5.00E-06	5.86E-01
273	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.2	5.00E-06	7.88E-01
274	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.44	5.00E-06	7.96E-01
275	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.64	5.00E-06	7.72E-01
276	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	7.15	5.00E-06	1.10E+00
277	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	8.88	5.00E-06	3.83E+00
278	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	9.9	5.00E-06	6.51E+00
279	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	3	5.00E-06	5.86E-01
280	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.16	5.00E-06	6.95E-01
281	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.62	5.00E-06	9.15E-01
282	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.94	5.00E-06	1.36E+00
283	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.68	5.00E-06	1.39E+00
284	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.09	5.00E-06	1.96E+00
285	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.36	5.00E-06	1.71E+00
286	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.54	5.00E-06	2.20E+00
287	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.78	5.00E-06	1.88E+00
288	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.94	5.00E-06	1.70E+00
289	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	7.02	5.00E-06	2.06E+00
290	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	7.35	5.00E-06	3.83E+00
291	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	9.19	5.00E-06	3.81E+01
292	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	9.96	5.00E-06	1.90E+02
293	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	3.06	5.00E-07	3.52E-01
294	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	3.61	5.00E-07	6.21E-01
295	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.22	5.00E-07	4.79E-01
296	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.59	5.00E-07	5.25E-01
297	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.14	5.00E-07	6.28E-01
298	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.61	5.00E-07	6.21E-01
299	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.9	5.00E-07	7.56E-01
300	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.29	5.00E-07	7.80E-01
301	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.65	5.00E-07	8.55E-01
302	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.84	5.00E-07	9.42E-01
303	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	7.02	5.00E-07	1.89E+00
304	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	7.16	5.00E-07	1.51E+00
305	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	7.58	5.00E-07	1.11E+00
306	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	8.44	5.00E-07	2.86E+00
307	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	9.23	5.00E-07	6.15E+00
308	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	10	5.00E-07	7.52E+00
309	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	3.07	5.00E-05	2.02E+00
310	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	3.58	5.00E-05	2.21E+00
311	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	4.06	5.00E-05	2.50E+00
312	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	4.37	5.00E-05	2.44E+00

313	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	4.78	5.00E-05	2.99E+00
314	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	5.86	5.00E-05	4.89E+00
315	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	6.4	5.00E-05	6.31E+00
316	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	6.62	5.00E-05	8.72E+00
317	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	6.92	5.00E-05	1.53E+01
318	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	7.15	5.00E-05	2.29E+01
319	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	7.41	5.00E-05	2.93E+01
320	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	7.93	5.00E-05	1.41E+02
321	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	9.24	5.00E-05	2.45E+02
322	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	9.91	5.00E-05	3.21E+02
323	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	3.14	5.00E-05	1.65E+00
324	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	3.63	5.00E-05	1.38E+00
325	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	3.99	5.00E-05	1.44E+00
326	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	4.35	5.00E-05	1.66E+00
327	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	4.69	5.00E-05	1.78E+00
328	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	5.14	5.00E-05	1.81E+00
329	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	5.73	5.00E-05	2.32E+00
330	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.33	5.00E-05	3.38E+00
331	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.72	5.00E-05	4.69E+00
332	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.91	5.00E-05	7.45E+00
333	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	7.84	5.00E-05	2.57E+01
334	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	8.04	5.00E-05	8.77E+01
335	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	9.17	5.00E-05	1.20E+02
336	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	9.83	5.00E-05	1.90E+02
337	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	3.95	5.00E-05	1.37E-01
338	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.06	5.00E-05	2.63E-01
339	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.63	5.00E-05	4.22E-01
340	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.28	5.00E-05	4.65E-01
341	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.73	5.00E-05	1.19E+00
342	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.99	5.00E-05	8.05E+00
343	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	7.16	5.00E-05	1.41E+01
344	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	7.63	5.00E-05	2.83E+01
345	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	8.66	5.00E-05	8.69E+01
346	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	9.24	5.00E-05	7.86E+01
347	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	3.06	5.00E-06	6.97E-01
348	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	3.59	5.00E-06	9.53E-01
349	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	4.12	5.00E-06	1.29E+00
350	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	4.51	5.00E-06	1.63E+00
351	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	5.04	5.00E-06	2.50E+00
352	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	5.3	5.00E-06	3.38E+00
353	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	5.64	5.00E-06	7.96E+00
354	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.08	5.00E-06	1.82E+01
355	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.21	5.00E-06	3.72E+01
356	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.6	5.00E-06	1.25E+02
357	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.96	5.00E-06	2.09E+02

358	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	2.99	5.00E-06	4.26E-02
359	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	3.37	5.00E-06	1.33E-01
360	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	3.63	5.00E-06	1.57E-01
361	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	3.94	5.00E-06	1.62E-01
362	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.29	5.00E-06	2.47E-01
363	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.67	5.00E-06	3.63E-01
364	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.98	5.00E-06	5.65E-01
365	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.27	5.00E-06	1.27E+00
366	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.48	5.00E-06	1.29E+00
367	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.64	5.00E-06	1.64E+00
368	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.86	5.00E-06	3.38E+00
369	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.22	5.00E-06	3.38E+00
370	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.31	5.00E-06	6.69E+00
371	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.39	5.00E-06	1.27E+01
372	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.75	5.00E-06	8.60E+00
373	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.93	5.00E-06	5.97E+01
374	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	7.68	5.00E-06	3.27E+01
375	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.53	5.00E-07	1.38E-01
376	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.83	5.00E-07	5.07E-01
377	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.93	5.00E-07	2.40E+00
378	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.38	5.00E-07	3.45E+00
379	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.43	5.00E-07	1.79E+00
380	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.04	5.00E-07	1.25E+01
381	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.12	5.00E-07	6.89E+00
382	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.24	5.00E-07	5.68E+00
383	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.54	5.00E-07	2.54E+01
384	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.72	5.00E-07	2.33E+01
385	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.75	5.00E-07	1.10E+01
386	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.98	5.00E-07	2.47E+01
387	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	7.97	5.00E-07	5.80E+00
388	Pb	2	1.19	1.55	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	9.23	5.00E-07	3.00E+01
389	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	3.02	5.00E-05	2.39E+00
390	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	3.63	5.00E-05	2.61E+00
391	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	4.14	5.00E-05	2.91E+00
392	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	4.33	5.00E-05	3.11E+00
393	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	4.76	5.00E-05	3.53E+00
394	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	5.11	5.00E-05	3.93E+00
395	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	5.74	5.00E-05	5.12E+00
396	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	6.27	5.00E-05	7.59E+00
397	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	6.83	5.00E-05	2.51E+01
398	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	7.03	5.00E-05	4.62E+01
399	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.001	9.32	5.00E-05	1.42E+02
400	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	3.12	5.00E-05	5.77E-01
401	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	3.53	5.00E-05	6.38E-01
402	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	4.06	5.00E-05	6.80E-01

403	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	4.44	5.00E-05	7.62E-01
404	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	4.72	5.00E-05	8.57E-01
405	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	5.2	5.00E-05	1.03E+00
406	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	5.75	5.00E-05	1.09E+00
407	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.22	5.00E-05	1.87E+00
408	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.74	5.00E-05	5.90E+00
409	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.94	5.00E-05	1.55E+01
410	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	7.52	5.00E-05	3.99E+01
411	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	7.77	5.00E-05	8.27E+01
412	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	8.45	5.00E-05	1.69E+02
413	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	10	5.00E-05	2.45E+02
414	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	3	5.00E-05	4.11E-02
415	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	3.18	5.00E-05	4.95E-02
416	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	3.73	5.00E-05	1.15E-01
417	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.24	5.00E-05	7.89E-02
418	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.66	5.00E-05	1.79E-01
419	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.93	5.00E-05	2.84E-01
420	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.31	5.00E-05	1.88E-01
421	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.93	5.00E-05	4.29E-01
422	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.47	5.00E-05	1.03E+00
423	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.88	5.00E-05	3.78E+00
424	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	7.1	5.00E-05	9.20E+00
425	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	7.31	5.00E-05	3.39E+01
426	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	7.77	5.00E-05	3.26E+01
427	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	8.92	5.00E-05	2.02E+02
428	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	9.49	5.00E-05	2.00E+02
429	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	3.02	5.00E-06	6.74E-01
430	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	3.34	5.00E-06	8.10E-01
431	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	3.74	5.00E-06	9.96E-01
432	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	4.25	5.00E-06	1.24E+00
433	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	4.61	5.00E-06	1.64E+00
434	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	5.13	5.00E-06	2.13E+00
435	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	5.63	5.00E-06	3.56E+00
436	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	5.86	5.00E-06	5.38E+00
437	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.34	5.00E-06	1.15E+01
438	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.42	5.00E-06	1.76E+01
439	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.58	5.00E-06	1.84E+01
440	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	6.73	5.00E-06	3.40E+01
441	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	7.48	5.00E-06	2.11E+02
442	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.02	9.2	5.00E-06	2.00E+02
443	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	3.04	5.00E-06	2.34E-01
444	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	3.59	5.00E-06	3.84E-01
445	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.14	5.00E-06	5.23E-01
446	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.6	5.00E-06	7.16E-01
447	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.08	5.00E-06	1.12E+00

448	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.16	5.00E-06	1.43E+00
449	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.08	5.00E-06	3.72E+00
450	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.35	5.00E-06	9.88E+00
451	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.56	5.00E-06	1.36E+01
452	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.73	5.00E-06	1.98E+01
453	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.76	5.00E-06	2.37E+01
454	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	7.15	5.00E-06	6.17E+01
455	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	7.28	5.00E-06	5.13E+01
456	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	8.56	5.00E-06	3.80E+01
457	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	9.75	5.00E-06	3.48E+01
458	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	3.05	5.00E-07	4.37E-01
459	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	3.57	5.00E-07	1.66E+00
460	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.12	5.00E-07	3.76E+00
461	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	4.57	5.00E-07	6.68E+00
462	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.08	5.00E-07	1.47E+01
463	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.86	5.00E-07	4.92E+01
464	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	5.94	5.00E-07	2.23E+02
465	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.37	5.00E-07	2.20E+02
466	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.59	5.00E-07	1.19E+01
467	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	6.73	5.00E-07	1.76E+01
468	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	7.14	5.00E-07	1.75E+02
469	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	8.31	5.00E-07	8.24E+01
470	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	8.51	5.00E-07	1.28E+01
471	Cu	2	0.73	1.75	76.4 ^j [5]	31.82 ^j [5]	2000	0.1	9.76	5.00E-07	7.54E+00
472	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	4.1	8.52E-06	2.13E+00
473	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	4.6	8.52E-06	2.33E+00
474	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	4.8	8.52E-06	2.56E+00
475	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	5.1	8.52E-06	2.44E+00
476	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	5.3	8.52E-06	2.56E+00
477	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	5.7	8.52E-06	2.57E+00
478	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6.1	8.52E-06	2.70E+00
479	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6.6	8.52E-06	2.71E+00
480	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6.9	8.52E-06	4.14E+00
481	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6.9	8.52E-06	3.76E+00
482	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	7.1	8.52E-06	1.98E+01
483	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	7.3	8.52E-06	1.06E+02
484	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	7.5	8.52E-06	2.13E+03
485	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	7.6	8.52E-06	2.13E+03
486	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	4.2	2.03E-06	1.02E+00
487	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	4.6	2.03E-06	7.63E-01
488	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	4.9	2.03E-06	6.87E-01
489	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	5.2	2.03E-06	4.98E-01
490	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	5.6	2.03E-06	1.88E-01
491	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	5.9	2.03E-06	2.02E-01
492	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6.6	2.03E-06	7.42E-02

493	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6.8	2.03E-06	1.12E-01
494	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	7	2.03E-06	4.17E-02
495	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	7.3	2.03E-06	1.93E-01
496	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6	3.64E-07	1.51E+00
497	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6	7.85E-07	2.17E+00
498	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6	1.38E-06	2.40E+00
499	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6	3.48E-06	2.35E+00
500	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6	5.36E-06	2.23E+00
501	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6	7.15E-06	2.30E+00
502	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6	1.03E-05	2.17E+00
503	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6	1.35E-05	2.03E+00
504	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6	1.69E-05	1.94E+00
505	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6	4.91E-07	2.00E-01
506	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6	1.04E-06	3.34E-01
507	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6	1.61E-06	4.23E-01
508	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6	2.56E-06	5.45E-01
509	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6	3.40E-06	4.27E-01
510	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6	5.10E-06	5.28E-01
511	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6	6.90E-06	5.40E-01
512	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6	8.62E-06	6.46E-01
513	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6	3.66E-07	7.73E-02
514	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6	6.07E-07	9.48E-02
515	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6	8.82E-07	3.32E-02
516	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6	1.35E-06	4.22E-02
517	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6	1.85E-06	6.06E-02
518	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6	2.26E-06	3.82E-02
519	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6	3.06E-06	1.05E-01
520	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6	3.70E-06	1.02E-01
521	Ni	2	0.69	1.75	76.4 ^j [5]	31.82 ^j [5]	500	0.01	6	4.38E-06	1.30E-01
522	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	20	0.6 ^m [8]	7.8	1.50E-07	5.10E-02
523	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	20	0.6 ^m [8]	7.7	1.50E-07	7.70E-02
524	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	20	0.6 ^m [8]	7.7	1.50E-07	9.30E-02
525	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	20	0.6 ^m [8]	8.5	1.50E-07	6.60E-02
526	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	20	0.6 ^m [8]	8.4	1.50E-07	9.20E-02
527	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	20	0.6 ^m [8]	8.4	1.50E-07	6.60E-02
528	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	20	0.6 ^m [8]	8.6	1.50E-07	6.50E-02
529	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	20	0.6 ^m [8]	8.6	1.50E-07	6.10E-02
530	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	20	0.6 ^m [8]	8.5	1.50E-07	7.40E-02
531	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	20	0.7	8.6	1.50E-07	5.50E-02
532	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	20	0.7	8.1	1.50E-07	6.40E-02
533	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	20	0.7	8.4	1.50E-07	5.80E-02
534	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	20	0.7	8.2	1.50E-07	6.50E-02
535	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	20	0.7	8.7	1.50E-07	5.80E-02
536	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	20	0.7	8.6	1.50E-07	5.30E-02
537	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	20	0.7	8.2	1.50E-07	6.40E-02

538	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	20	0.7	8.5	1.50E-07	5.70E-02
539	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	20	0.02	8.5	1.50E-07	8.80E-01
540	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	20	0.02	8.7	1.50E-07	1.20E+00
541	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	20	0.02	9	1.50E-07	1.00E+00
542	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	20	0.1	8.4	1.50E-07	2.40E-01
543	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	20	0.1	8.4	1.50E-07	3.50E-01
544	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	20	0.1	8.4	1.50E-07	3.80E-01
545	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	20	0.02	9.4	1.50E-07	1.00E-01
546	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	20	0.02	9.5	1.50E-07	1.00E-01
547	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	20	0.1	8.9	1.50E-07	7.60E-01
548	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	20	0.1	9	1.50E-07	1.10E+00
549	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	20	0.7	8.8	1.50E-07	4.60E-02
550	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	20	0.7	8.7	1.50E-07	3.60E-02
551	Tc	4	0.645	1.36	73.2 ^k [4]	687 ^k [4]	100	0.715 ⁿ [9]	8.2	5.00E-11	1.00E+01
552	Tc	4	0.645	1.36	73.2 ^k [4]	687 ^k [4]	100	0.715 ⁿ [9]	8.2	5.00E-11	1.00E+01
553	Tc	7	0.56	1.36	73.2 ^k [4]	687 ^k [4]	100	0.715 ⁿ [9]	8	5.00E-11	2.10E-01
554	Tc	7	0.56	1.36	73.2 ^k [4]	687 ^k [4]	100	0.715 ⁿ [9]	8.1	5.00E-11	2.20E-01
555	Tc	7	0.56	1.36	73.2 ^k [4]	687 ^k [4]	100	0.715 ⁿ [9]	8	5.00E-11	2.30E-01
556	Tc	7	0.56	1.36	73.2 ^k [4]	687 ^k [4]	100	0.715 ⁿ [9]	8.1	5.00E-11	2.40E-01
557	Tc	7	0.56	1.36	73.2 ^k [4]	687 ^k [4]	100	0	10.1	5.00E-11	4.80E-02
558	Tc	7	0.56	1.36	73.2 ^k [4]	687 ^k [4]	100	0	10.1	5.00E-11	5.10E-02
559	Tc	7	0.56	1.36	73.2 ^k [4]	687 ^k [4]	100	0	10.2	5.00E-11	5.50E-02
560	Tc	4	0.645	1.36	73.2 ^k [4]	687 ^k [4]	100	0	10.1	5.00E-11	5.90E-01
561	Tc	7	0.56	1.36	73.2 ^k [4]	687 ^k [4]	100	0	10.2	5.00E-11	5.90E-02
562	Tc	4	0.645	1.36	73.2 ^k [4]	687 ^k [4]	100	0	10.2	5.00E-11	6.20E-01
563	Tc	4	0.645	1.36	73.2 ^k [4]	687 ^k [4]	100	0	10.1	5.00E-11	6.40E-01
564	Tc	4	0.645	1.36	73.2 ^k [4]	687 ^k [4]	100	0	10.2	5.00E-11	6.40E-01
565	Tc	4	0.645	1.36	73.2 ^k [4]	687 ^k [4]	100	0.715 ⁿ [9]	8.2	5.00E-11	9.10E+00
566	Tc	4	0.645	1.36	73.2 ^k [4]	687 ^k [4]	100	0.715 ⁿ [9]	8.2	5.00E-11	9.80E+00
567	U	4	0.89	1.22	73.2 ^k [4]	687 ^k [4]	100	0	10.2	1.50E-07	1.50E+02
568	U	4	0.89	1.22	73.2 ^k [4]	687 ^k [4]	100	0.715 ⁿ [9]	8	1.50E-07	1.50E+02
569	U	6	0.73	1.22	73.2 ^k [4]	687 ^k [4]	100	0.715 ⁿ [9]	8.2	1.50E-07	1.50E-01
570	U	4	0.89	1.22	73.2 ^k [4]	687 ^k [4]	100	0.715 ⁿ [9]	8.1	1.50E-07	1.60E+02
571	U	6	0.73	1.22	73.2 ^k [4]	687 ^k [4]	100	0.715 ⁿ [9]	8.2	1.50E-07	1.60E-01
572	U	6	0.73	1.22	73.2 ^k [4]	687 ^k [4]	100	0.715 ⁿ [9]	8.1	1.50E-07	1.70E+02
573	U	4	0.89	1.22	73.2 ^k [4]	687 ^k [4]	100	0.715 ⁿ [9]	8	1.50E-07	1.80E+02
574	U	6	0.73	1.22	73.2 ^k [4]	687 ^k [4]	100	0	10.2	1.50E-07	1.80E-01
575	U	6	0.73	1.22	73.2 ^k [4]	687 ^k [4]	100	0	10.2	1.50E-07	1.90E-01
576	U	6	0.73	1.22	73.2 ^k [4]	687 ^k [4]	100	0.715 ⁿ [9]	8.2	1.50E-07	1.90E-01
577	U	6	0.73	1.22	73.2 ^k [4]	687 ^k [4]	100	0.715 ⁿ [9]	8.2	1.50E-07	2.00E-01
578	U	6	0.73	1.22	73.2 ^k [4]	687 ^k [4]	100	0	10.2	1.50E-07	2.30E-01
579	U	6	0.73	1.22	73.2 ^k [4]	687 ^k [4]	100	0	10.2	1.50E-07	2.40E-01
580	U	4	0.89	1.22	73.2 ^k [4]	687 ^k [4]	100	0	10.2	1.50E-07	5.20E+02
581	U	4	0.89	1.22	73.2 ^k [4]	687 ^k [4]	100	0	10.2	1.50E-07	5.90E+02
582	U	4	0.89	1.22	73.2 ^k [4]	687 ^k [4]	100	0	10.2	1.50E-07	6.70E+02

583	Cm	3	0.97	1.2	73.2 ^k [4]	687 ^k [4]	20	0	10.1	1.00E-10	2.10E+02
584	Cm	3	0.97	1.2	73.2 ^k [4]	687 ^k [4]	20	0	9.4	1.00E-10	2.10E+02
585	Cm	3	0.97	1.2	73.2 ^k [4]	687 ^k [4]	20	0	9.4	1.00E-10	2.30E+01
586	Cm	3	0.97	1.2	73.2 ^k [4]	687 ^k [4]	20	0	10.1	1.00E-10	3.50E+01
587	Cm	3	0.97	1.2	73.2 ^k [4]	687 ^k [4]	20	0	9.4	1.00E-10	5.10E+02
588	Cm	3	0.97	1.2	73.2 ^k [4]	687 ^k [4]	20	0	10.1	1.00E-10	5.20E+01
589	Cm	3	0.97	1.2	73.2 ^k [4]	687 ^k [4]	20	0	10.1	1.00E-10	6.50E+01
590	Cm	3	0.97	1.2	73.2 ^k [4]	687 ^k [4]	20	0	9.4	1.00E-10	6.90E+01
591	Tc	4	0.645	1.36	73.2 ^k [4]	687 ^k [4]	20	0	9.4	8.00E-11	1.30E+01
592	Tc	4	0.645	1.36	73.2 ^k [4]	687 ^k [4]	20	0	10	8.00E-11	1.40E+00
593	Tc	4	0.645	1.36	73.2 ^k [4]	687 ^k [4]	20	0	10	8.00E-11	1.50E+00
594	Tc	4	0.645	1.36	73.2 ^k [4]	687 ^k [4]	20	0	9.4	8.00E-11	1.50E+01
595	Tc	4	0.645	1.36	73.2 ^k [4]	687 ^k [4]	20	0	10.1	8.00E-11	1.60E+00
596	Tc	4	0.645	1.36	73.2 ^k [4]	687 ^k [4]	20	0	10.1	8.00E-11	1.70E+00
597	Tc	4	0.645	1.36	73.2 ^k [4]	687 ^k [4]	20	0	9.4	8.00E-11	2.10E+01
598	Tc	4	0.645	1.36	73.2 ^k [4]	687 ^k [4]	20	0	9.4	8.00E-11	8.00E+00
599	U	4	0.89	1.22	73.2 ^k [4]	687 ^k [4]	20	0	10.1	1.00E-07	1.70E+01
600	U	4	0.89	1.22	73.2 ^k [4]	687 ^k [4]	20	0	10.1	1.00E-07	1.80E+01
601	U	4	0.89	1.22	73.2 ^k [4]	687 ^k [4]	20	0	9.4	1.00E-07	2.70E+01
602	U	4	0.89	1.22	73.2 ^k [4]	687 ^k [4]	20	0	10.1	1.00E-07	2.80E+01
603	U	4	0.89	1.22	73.2 ^k [4]	687 ^k [4]	20	0	9.4	1.00E-07	3.30E+01
604	U	4	0.89	1.22	73.2 ^k [4]	687 ^k [4]	20	0	9.4	1.00E-07	3.80E+01
605	U	4	0.89	1.22	73.2 ^k [4]	687 ^k [4]	20	0	10.1	1.00E-07	3.90E+01
606	U	4	0.89	1.22	73.2 ^k [4]	687 ^k [4]	20	0	9.4	1.00E-07	5.20E+01
607	Ac	3	1.12	1	73.2 ^k [4]	687 ^k [4]	20	0	9.4	2.40E-09	1.10E+01
608	Ac	3	1.12	1	73.2 ^k [4]	687 ^k [4]	20	0	10.1	2.20E-09	1.30E+02
609	Ac	3	1.12	1	73.2 ^k [4]	687 ^k [4]	20	0	9.4	2.40E-09	1.60E+02
610	Ac	3	1.12	1	73.2 ^k [4]	687 ^k [4]	20	0	9.4	2.40E-09	2.10E+00
611	Ac	3	1.12	1	73.2 ^k [4]	687 ^k [4]	20	0	9.4	2.40E-09	3.10E+01
612	Ac	3	1.12	1	73.2 ^k [4]	687 ^k [4]	20	0	10.1	2.20E-09	3.40E+01
613	Ac	3	1.12	1	73.2 ^k [4]	687 ^k [4]	20	0	9.4	2.40E-09	5.00E+01
614	Ac	3	1.12	1	73.2 ^k [4]	687 ^k [4]	20	0	10.1	2.20E-09	5.40E+01
615	Ac	3	1.12	1	73.2 ^k [4]	687 ^k [4]	20	0	10.1	2.20E-09	5.80E+01
616	Ac	3	1.12	1	73.2 ^k [4]	687 ^k [4]	20	0	10.1	2.20E-09	5.90E+01
617	Ac	3	1.12	1	73.2 ^k [4]	687 ^k [4]	20	0	9.4	2.40E-09	9.30E+01
618	Ac	3	1.12	1	73.2 ^k [4]	687 ^k [4]	20	0	10.1	2.20E-09	9.40E+01
619	Cm	3	0.97	1.2	73.2 ^k [4]	687 ^k [4]	20	0	9.4	1.70E-10	2.20E+01
620	Cm	3	0.97	1.2	73.2 ^k [4]	687 ^k [4]	20	0	10.1	1.70E-10	2.30E+00
621	Cm	3	0.97	1.2	73.2 ^k [4]	687 ^k [4]	20	0	10.1	1.70E-10	2.90E+01
622	Cm	3	0.97	1.2	73.2 ^k [4]	687 ^k [4]	20	0	9.4	1.70E-10	3.30E+01
623	Pa	4	0.9	1.14	73.2 ^k [4]	687 ^k [4]	20	0	10.1	1.30E-11	1.90E+02
624	Pa	4	0.9	1.14	73.2 ^k [4]	687 ^k [4]	20	0	10.1	1.30E-11	1.90E+02
625	Pa	4	0.9	1.14	73.2 ^k [4]	687 ^k [4]	20	0	10.1	1.30E-11	2.10E+02
626	Pa	4	0.9	1.14	73.2 ^k [4]	687 ^k [4]	20	0	10.1	1.30E-11	2.60E+02
627	Pa	4	0.9	1.14	73.2 ^k [4]	687 ^k [4]	20	0	10.1	1.30E-11	2.60E+02

628	Pa	4	0.9	1.14	73.2 ^k [4]	687 ^k [4]	20	0	9.4	1.30E-11	2.90E+02
629	Pa	4	0.9	1.14	73.2 ^k [4]	687 ^k [4]	20	0	9.4	1.30E-11	3.20E+02
630	Pa	4	0.9	1.14	73.2 ^k [4]	687 ^k [4]	20	0	9.4	1.30E-11	3.30E+02
631	Pa	4	0.9	1.14	73.2 ^k [4]	687 ^k [4]	20	0	10.1	1.30E-11	3.50E+02
632	Pa	4	0.9	1.14	73.2 ^k [4]	687 ^k [4]	20	0	9.4	1.30E-11	7.60E+00
633	Pa	4	0.9	1.14	73.2 ^k [4]	687 ^k [4]	20	0	9.4	1.30E-11	8.10E+00
634	Pa	4	0.9	1.14	73.2 ^k [4]	687 ^k [4]	20	0	9.4	1.30E-11	9.90E+00
635	Am	3	0.975	1.2	73.2 ^k [4]	687 ^k [4]	58.22	0	8.2	1.00E-09	1.00E+01
636	Am	3	0.975	1.2	73.2 ^k [4]	687 ^k [4]	109.5	0	8.2	1.00E-09	1.00E+01
637	Am	3	0.975	1.2	73.2 ^k [4]	687 ^k [4]	20	0	8.2	1.00E-09	1.01E+01
638	Am	3	0.975	1.2	73.2 ^k [4]	687 ^k [4]	58.22	0	8.2	1.00E-09	1.32E+00
639	Am	3	0.975	1.2	73.2 ^k [4]	687 ^k [4]	20	0	8.2	1.00E-09	1.67E+00
640	Am	3	0.975	1.2	73.2 ^k [4]	687 ^k [4]	109.5	0	8.2	1.00E-09	2.12E+00
641	Am	3	0.975	1.2	73.2 ^k [4]	687 ^k [4]	58.22	0	8.2	1.00E-09	4.48E+00
642	Am	3	0.975	1.2	73.2 ^k [4]	687 ^k [4]	20	0	8.2	1.00E-09	6.20E-01
643	Am	3	0.975	1.2	73.2 ^k [4]	687 ^k [4]	109.5	0	8.2	1.00E-09	7.52E+00
644	Sn	4	0.69	1.72	73.2 ^k [4]	687 ^k [4]	10000	0.01	10.9	1.10E-06	6.80E+00
645	Sn	4	0.69	1.72	73.2 ^k [4]	687 ^k [4]	10000	0.01	11	1.10E-06	7.30E+00
646	Sn	4	0.69	1.72	73.2 ^k [4]	687 ^k [4]	9550	0.01	8.9	7.00E-09	1.10E+02
647	Sn	4	0.69	1.72	73.2 ^k [4]	687 ^k [4]	9550	0.01	8.8	7.00E-09	1.82E+02
648	Sn	4	0.69	1.72	73.2 ^k [4]	687 ^k [4]	9550	0.01	10.8	7.00E-09	2.50E+01
649	Sn	4	0.69	1.72	73.2 ^k [4]	687 ^k [4]	9550	0.01	5.4	7.00E-09	2.90E+02
650	Sn	4	0.69	1.72	73.2 ^k [4]	687 ^k [4]	9550	0.01	10.8	7.00E-09	3.00E+01
651	Sn	4	0.69	1.72	73.2 ^k [4]	687 ^k [4]	9550	0.01	5.3	7.00E-09	4.00E+02
652	Sn	4	0.69	1.72	73.2 ^k [4]	687 ^k [4]	9550	0.01	9	7.00E-09	5.60E+02
653	Sn	4	0.69	1.72	73.2 ^k [4]	687 ^k [4]	9950	0.1	8.7	9.00E-09	1.00E+03
654	Sn	4	0.69	1.72	73.2 ^k [4]	687 ^k [4]	9950	0.1	5.8	9.00E-09	1.10E+03
655	Sn	4	0.69	1.72	73.2 ^k [4]	687 ^k [4]	9950	0.1	11.2	9.00E-09	1.30E+01
656	Sn	4	0.69	1.72	73.2 ^k [4]	687 ^k [4]	9950	0.1	9.2	9.00E-09	1.30E+02
657	Sn	4	0.69	1.72	73.2 ^k [4]	687 ^k [4]	9950	0.1	5.9	9.00E-09	6.60E+02
658	Sn	4	0.69	1.72	73.2 ^k [4]	687 ^k [4]	9950	0.1	11	9.00E-09	6.70E+00
659	Np	5	0.75	1.22	73.2 ^k [4]	687 ^k [4]	10	0.01	3	1.05E-06	1.21E-03
660	Np	5	0.75	1.22	73.2 ^k [4]	687 ^k [4]	10	0.01	6	1.05E-06	1.35E-03
661	Np	5	0.75	1.22	73.2 ^k [4]	687 ^k [4]	100	0.01	2.7	1.05E-06	1.66E-04
662	Np	5	0.75	1.22	73.2 ^k [4]	687 ^k [4]	100	0.01	8	1.05E-06	1.70E-01
663	Np	5	0.75	1.22	73.2 ^k [4]	687 ^k [4]	100	0.01	8.2	1.05E-06	1.70E-01
664	Np	5	0.75	1.22	73.2 ^k [4]	687 ^k [4]	10	0.01	8.2	1.05E-06	1.85E-02
665	Np	5	0.75	1.22	73.2 ^k [4]	687 ^k [4]	10	0.01	8	1.05E-06	2.04E-02
666	Np	5	0.75	1.22	73.2 ^k [4]	687 ^k [4]	100	0.01	10.8	1.05E-06	2.88E-01
667	Np	5	0.75	1.22	73.2 ^k [4]	687 ^k [4]	10	0.01	10.4	1.05E-06	3.18E-01
668	Np	5	0.75	1.22	73.2 ^k [4]	687 ^k [4]	100	0.01	9.2	1.05E-06	3.23E-01
669	Np	5	0.75	1.22	73.2 ^k [4]	687 ^k [4]	10	0.01	6.5	1.05E-06	3.41E-02
670	Np	5	0.75	1.22	73.2 ^k [4]	687 ^k [4]	100	0.01	10.9	1.05E-06	3.57E-01
671	Np	5	0.75	1.22	73.2 ^k [4]	687 ^k [4]	10	0.01	9.4	1.05E-06	3.65E-01
672	Np	5	0.75	1.22	73.2 ^k [4]	687 ^k [4]	100	0.01	8.5	1.05E-06	3.78E-02

673	Np	5	0.75	1.22	73.2 ^k [4]	687 ^k [4]	10	0.01	4.7	1.05E-06	3.78E-03
674	Np	5	0.75	1.22	73.2 ^k [4]	687 ^k [4]	10	0.01	8.5	1.05E-06	3.81E-02
675	Np	5	0.75	1.22	73.2 ^k [4]	687 ^k [4]	100	0.01	3.3	1.05E-06	3.90E-03
676	Np	5	0.75	1.22	73.2 ^k [4]	687 ^k [4]	10	0.01	3.2	1.05E-06	4.03E-03
677	Np	5	0.75	1.22	73.2 ^k [4]	687 ^k [4]	10	0.01	8.5	1.05E-06	4.55E-02
678	Np	5	0.75	1.22	73.2 ^k [4]	687 ^k [4]	10	0.01	11.5	1.05E-06	5.22E+00
679	Np	5	0.75	1.22	73.2 ^k [4]	687 ^k [4]	10	0.01	7.8	1.05E-06	5.85E-02
680	Np	5	0.75	1.22	73.2 ^k [4]	687 ^k [4]	10	0.01	2.8	1.05E-06	6.00E-04
681	Np	5	0.75	1.22	73.2 ^k [4]	687 ^k [4]	100	0.01	11.8	1.05E-06	6.51E+00
682	Np	5	0.75	1.22	73.2 ^k [4]	687 ^k [4]	100	0.01	9.6	1.05E-06	6.79E-01
683	Am	3	0.975	1.2	73.2 ^k [4]	687 ^k [4]	500	0	7.6	1.00E-09	1.01E+02
684	Am	3	0.975	1.2	73.2 ^k [4]	687 ^k [4]	500	0	8.85	1.00E-09	1.14E+01
685	Am	3	0.975	1.2	73.2 ^k [4]	687 ^k [4]	500	0	7.55	1.00E-09	1.28E+02
686	Am	3	0.975	1.2	73.2 ^k [4]	687 ^k [4]	500	0	8.85	1.00E-09	1.37E+01
687	Am	3	0.975	1.2	73.2 ^k [4]	687 ^k [4]	500	0	7.9	1.00E-09	2.15E+01
688	Am	3	0.975	1.2	73.2 ^k [4]	687 ^k [4]	500	0	6.65	1.00E-09	3.52E+01
689	Am	3	0.975	1.2	73.2 ^k [4]	687 ^k [4]	500	0	5.2	1.00E-09	3.74E+01
690	Am	3	0.975	1.2	73.2 ^k [4]	687 ^k [4]	500	0	8.25	1.00E-09	3.82E+01
691	Am	3	0.975	1.2	73.2 ^k [4]	687 ^k [4]	500	0	7.05	1.00E-09	4.87E+01
692	Am	3	0.975	1.2	73.2 ^k [4]	687 ^k [4]	500	0	5.85	1.00E-09	5.57E+01
693	Am	3	0.975	1.2	73.2 ^k [4]	687 ^k [4]	500	0	8.6	1.00E-09	7.92E+00
694	Am	3	0.975	1.2	73.2 ^k [4]	687 ^k [4]	500	0	7.2	1.00E-09	9.43E+01
695	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	500	0	8.68	7.52E-05	1.35E+00
696	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	500	0	9.72	7.52E-05	1.50E+00
697	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	500	0	10.51	7.52E-05	2.28E+00
698	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	500	0	2.81	7.52E-05	2.46E-01
699	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	500	0	2.53	7.52E-05	2.69E-01
700	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	500	0	4.19	7.52E-05	5.42E-01
701	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	500	0	5.57	7.52E-05	6.97E-01
702	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	500	0	6.92	7.52E-05	8.51E-01
703	Th	4	0.94	1.11	73.2 ^k [4]	687 ^k [4]	100	0.1	8.57	1.00E-06	1.30E+01
704	Th	4	0.94	1.11	73.2 ^k [4]	687 ^k [4]	100	0.1	8.63	1.00E-06	1.30E+01
705	Th	4	0.94	1.11	73.2 ^k [4]	687 ^k [4]	100	0.1	8.63	1.00E-06	1.40E+01
706	Th	4	0.94	1.11	73.2 ^k [4]	687 ^k [4]	100	0.1	8.57	1.00E-06	1.70E+01
707	Th	4	0.94	1.11	73.2 ^k [4]	687 ^k [4]	100	0	9.67	8.00E-10	7.70E-02
708	Th	4	0.94	1.11	73.2 ^k [4]	687 ^k [4]	100	0	10	8.00E-10	7.90E-02
709	Th	4	0.94	1.11	73.2 ^k [4]	687 ^k [4]	100	0	10	8.00E-10	1.20E-02
710	Th	4	0.94	1.11	73.2 ^k [4]	687 ^k [4]	100	0.715 ⁿ [9]	7.9	4.00E-09	8.20E-01
711	Th	4	0.94	1.11	73.2 ^k [4]	687 ^k [4]	100	0.715 ⁿ [9]	7.9	4.00E-09	8.20E-01
712	Th	4	0.94	1.11	73.2 ^k [4]	687 ^k [4]	100	0.715 ⁿ [9]	7.97	4.00E-09	8.20E-01
713	Th	4	0.94	1.11	73.2 ^k [4]	687 ^k [4]	100	0.715 ⁿ [9]	7.97	4.00E-09	8.20E-01
714	Co	2	0.745	1.7	73.2 ^k [4]	687 ^k [4]	50	0.007 ^o [10]	1.5	1.00E-02	3.00E-04
715	Co	2	0.745	1.7	73.2 ^k [4]	687 ^k [4]	50	0.007 ^o [10]	7.3	1.00E-02	1.30E-03
716	Co	2	0.745	1.7	73.2 ^k [4]	687 ^k [4]	50	0.007 ^o [10]	7.3	1.00E-02	2.90E-03
717	Co	2	0.745	1.7	73.2 ^k [4]	687 ^k [4]	50	0.007 ^o [10]	1.6	1.00E-02	4.40E-03

718	Co	2	0.745	1.7	73.2 ^k [4]	687 ^k [4]	50	0.007 ^o [10]	2.9	1.02E-03	6.30E-03
719	Co	2	0.745	1.7	73.2 ^k [4]	687 ^k [4]	50	0.007 ^o [10]	7.8	9.33E-06	3.50E-01
720	Co	2	0.745	1.7	73.2 ^k [4]	687 ^k [4]	50	0.007 ^o [10]	7.1	1.02E-04	4.30E-01
721	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	50	0.007 ^o [10]	7.3	7.71E-03	7.50E-03
722	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	50	0.007 ^o [10]	7.3	7.71E-03	7.80E-03
723	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	50	0.007 ^o [10]	1.5	7.71E-03	9.90E-03
724	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	50	0.007 ^o [10]	2.9	8.13E-04	3.70E-02
725	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	50	0.007 ^o [10]	1.6	7.71E-03	4.40E-02
726	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	50	0.007 ^o [10]	7.8	8.35E-06	8.90E-02
727	Cs	1	1.67	0.86	73.2 ^k [4]	687 ^k [4]	50	0.007 ^o [10]	7.1	8.05E-05	4.50E-01
728	I	-1	2.2	2.21	73.2 ^k [4]	687 ^k [4]	5	0.007 ^o [10]	7.9	9.46E-03	8.00E-05
729	Sr	2	1.18	0.99	73.2 ^k [4]	687 ^k [4]	50	0.007 ^o [10]	7.3	1.18E-02	1.90E-03
730	Sr	2	1.18	0.99	73.2 ^k [4]	687 ^k [4]	50	0.007 ^o [10]	1.5	1.18E-02	2.20E-03
731	Sr	2	1.18	0.99	73.2 ^k [4]	687 ^k [4]	50	0.007 ^o [10]	7.3	1.18E-02	2.40E-03
732	Sr	2	1.18	0.99	73.2 ^k [4]	687 ^k [4]	50	0.007 ^o [10]	1.6	1.18E-02	6.80E-03
733	Sr	2	1.18	0.99	73.2 ^k [4]	687 ^k [4]	50	0.007 ^o [10]	2.9	1.16E-03	8.00E-03
734	Sr	2	1.18	0.99	73.2 ^k [4]	687 ^k [4]	50	0.007 ^o [10]	7.8	1.27E-05	3.00E-01
735	Sr	2	1.18	0.99	73.2 ^k [4]	687 ^k [4]	50	0.007 ^o [10]	7.1	1.18E-04	3.80E-01
736	Po	4	0.94	1.76	73.2 ^k [4]	687 ^k [4]	20	0	10.1	1.10E-11	2.70E+01
737	Po	4	0.94	1.76	73.2 ^k [4]	687 ^k [4]	20	0	10.1	1.10E-11	3.20E+01
738	Po	4	0.94	1.76	73.2 ^k [4]	687 ^k [4]	20	0	10.1	1.10E-11	5.50E+01
739	Po	4	0.94	1.76	73.2 ^k [4]	687 ^k [4]	20	0	10.1	1.10E-11	7.50E+01
740	Po	4	0.94	1.76	73.2 ^k [4]	687 ^k [4]	20	0	10.1	1.10E-11	8.20E+01
741	Po	4	0.94	1.76	73.2 ^k [4]	687 ^k [4]	20	0	10.1	1.10E-11	8.50E+01
742	Pu	4	0.86	1.22	73.2 ^k [4]	687 ^k [4]	20	0	9.4	4.30E-11	1.30E+01
743	Pu	4	0.86	1.22	73.2 ^k [4]	687 ^k [4]	20	0	9.4	4.30E-11	1.60E+01
744	Pu	4	0.86	1.22	73.2 ^k [4]	687 ^k [4]	20	0	9.4	4.30E-11	1.10E+01
745	Pu	4	0.86	1.22	73.2 ^k [4]	687 ^k [4]	20	0	9.4	4.30E-11	2.10E+01
746	Pu	4	0.86	1.22	73.2 ^k [4]	687 ^k [4]	20	0	9.4	4.30E-11	8.70E+01
747	Pu	4	0.86	1.22	73.2 ^k [4]	687 ^k [4]	20	0	9.4	4.30E-11	2.70E+01
748	Am	3	0.975	1.2	73.2 ^k [4]	687 ^k [4]	20	0	9.4	1.20E-10	1.20E+01
749	Am	3	0.975	1.2	73.2 ^k [4]	687 ^k [4]	20	0	9.4	1.20E-10	3.00E+01
750	Am	3	0.975	1.2	73.2 ^k [4]	687 ^k [4]	20	0	9.4	1.20E-10	1.00E+02
751	Am	3	0.975	1.2	73.2 ^k [4]	687 ^k [4]	20	0	9.4	1.20E-10	4.60E+01
752	Am	3	0.975	1.2	73.2 ^k [4]	687 ^k [4]	20	0	9.4	1.20E-10	1.10E+02
753	Am	3	0.975	1.2	73.2 ^k [4]	687 ^k [4]	20	0	9.4	1.20E-10	3.00E+01
754	Ni	2	0.69	1.75	73.2 ^k [4]	687 ^k [4]	100	0.1	7.63	1.00E-04	1.15E+00
755	Ni	2	0.69	1.75	73.2 ^k [4]	687 ^k [4]	100	0.001	10.94	1.00E-06	1.56E+00
756	Ni	2	0.69	1.75	73.2 ^k [4]	687 ^k [4]	100	0.001	4.66	1.00E-04	2.71E-01
757	Ni	2	0.69	1.75	73.2 ^k [4]	687 ^k [4]	100	0.1	4.91	1.00E-04	2.78E-02
758	Ni	2	0.69	1.75	73.2 ^k [4]	687 ^k [4]	100	0.1	10.78	1.00E-06	2.90E+00
759	Ni	2	0.69	1.75	73.2 ^k [4]	687 ^k [4]	100	0.1	10.83	1.00E-06	2.90E+00
760	Ni	2	0.69	1.75	73.2 ^k [4]	687 ^k [4]	100	0.001	7.34	1.00E-04	3.17E+00
761	Ni	2	0.69	1.75	73.2 ^k [4]	687 ^k [4]	100	0.001	7.47	1.00E-04	3.17E+00
762	Ni	2	0.69	1.75	73.2 ^k [4]	687 ^k [4]	100	0.001	10.96	1.00E-06	3.56E+00

763	Ni	2	0.69	1.75	73.2 ^{k)} [4]	687 ^{k)} [4]	100	0.001	5.05	1.00E-04	3.71E-01
764	Ni	2	0.69	1.75	73.2 ^{k)} [4]	687 ^{k)} [4]	100	0.1	5.1	1.00E-04	7.00E-02
765	Ni	2	0.69	1.75	73.2 ^{k)} [4]	687 ^{k)} [4]	100	0.1	7.64	1.00E-04	7.73E-01
766	Nb	5	0.64	1.23	73.2 ^{k)} [4]	687 ^{k)} [4]	50	0	7.7	1.40E-07	1.15E+00
767	Nb	5	0.64	1.23	73.2 ^{k)} [4]	687 ^{k)} [4]	50	0.715 ⁿ⁾ [9]	7.1	2.20E-07	1.20E+00
768	Nb	5	0.64	1.23	73.2 ^{k)} [4]	687 ^{k)} [4]	50	0	7.8	1.40E-07	1.38E+00
769	Nb	5	0.64	1.23	73.2 ^{k)} [4]	687 ^{k)} [4]	50	0	8.2	1.40E-07	1.44E+00
770	Nb	5	0.64	1.23	73.2 ^{k)} [4]	687 ^{k)} [4]	50	0.715 ⁿ⁾ [9]	7.4	2.20E-07	1.84E+00
771	Nb	5	0.64	1.23	73.2 ^{k)} [4]	687 ^{k)} [4]	50	0.715 ⁿ⁾ [9]	7.5	2.20E-07	6.38E+00
772	Zr	4	0.72	1.22	73.2 ^{k)} [4]	687 ^{k)} [4]	50	0	7.7	9.20E-08	1.30E+00
773	Zr	4	0.72	1.22	73.2 ^{k)} [4]	687 ^{k)} [4]	50	0.715 ⁿ⁾ [9]	7.4	1.50E-07	1.55E+00
774	Zr	4	0.72	1.22	73.2 ^{k)} [4]	687 ^{k)} [4]	50	0	7.8	9.20E-08	2.77E+00
775	Zr	4	0.72	1.22	73.2 ^{k)} [4]	687 ^{k)} [4]	50	0	8.2	9.20E-08	6.91E+00
776	Zr	4	0.72	1.22	73.2 ^{k)} [4]	687 ^{k)} [4]	50	0.715 ⁿ⁾ [9]	7.5	1.50E-07	8.28E+00
777	Zr	4	0.72	1.22	73.2 ^{k)} [4]	687 ^{k)} [4]	50	0.715 ⁿ⁾ [9]	7.1	1.50E-07	9.50E-01

a) Oxidation number; b) Ionic radius; c) Electronegativity; d) Cation exchange capacity; e) Surface area; f) Solid-liquid ratio; g) Ionic strength; h) Initial radionuclide concentration; i) represented as 'MX-80' in JAEA-SDB; j) represented as 'SWy-2' in JAEA-SDB; k) represented as 'Kunigel V1' in JAEA-SDB; l) represented as 'synthetic groundwater' in JAEA-SDB; m) represented as 'synthetic porewater' in JAEA-SDB; n) represented as 'seawater' in JAEA-SDB; o) represented as 'tap water' in JAEA-SDB

References

- [1] Sugiura Y.; Suyama T.; Tachi, Y. *Development of JAEA sorption database (JAEA-SDB): Update of sorption/QA Data in FY2019*; Japan Atomic Energy Agency: Ibaraki, Japan, 2020, doi:10.11484/jaea-data-code-2019-022.
- [2] Shannon, R.D. Revised effective ionic radii and systematic studies of interatomic distances in halides and chalcogenides. *Acta crystallographica section A: crystal physics, diffraction, theoretical and general crystallography* **1976**, 32, 751-767.
- [3] Little Jr, E.J.; Jones, M.M. A complete table of electronegativities. *Journal of chemical education* **1960**, 37, 231-233.
- [4] Chen, T.; Sedighi, M.; Jivkov, A.; Seetharam, S. A model for hydraulic conductivity of compacted bentonite–inclusion of microstructure effects under confined wetting. *Géotechnique* **2020**, 71, 1-14.
- [5] Physical and Chemical Data of Source Clays. Available online: https://www.clays.org/sourceclays_data/ (accessed on 01 May 2022)
- [6] Torstenfelt, B.; Andersson, K.; Allard, B. *Sorption of Sr and Cs on Rocks and Minerals*; National Council for Radioactive Waste: Stockholm, Sweden, 1981.
- [7] Torstenfelt, B.; Kipatsi, K.; Andersson, K.; Allard, B.; Olofsson, U. Transport of actinides through a bentonite backfill. In *Scientific Basis for Nuclear Waste Management-V*; Lutze, W.; Elsevier, New York, 1982, pp. 659-668.
- [8] Kitamura, A.; Tomura, T.; Sato, H.; Nakayama, M. *Sorption behavior of cesium onto bentonite and sedimentary rocks in saline groundwaters*; Japan Atomic Energy Agency: Ibaraki, Japan, 2008.
- [9] Millero, F. J.; Feistel, R.; Wright, D.G.; McDougall, T.J. The composition of Standard Seawater and the definition of the Reference-Composition Salinity Scale. *Deep Sea Research Part I: Oceanographic Research Papers* **2008**, 55, 50-72.
- [10] Mateus, M.V.; Araújo, L.S.; Leopoldino, A.B.; Ferreira, M.S.; Ferreira D.C.; Lus, M.S.L.; Gonçalves*, J.C.S.I. Molecular interactions and modeling of anionic surfactant effect on oxygen transfer in a cylindrical reactor. In *Environmental Engineering Science*; Mary Ann Liebert, Inc.: New York, USA, 2019; Volume 36, pp. 180-185.