Supplemental Materials AM-13-048

High-pressure and temperature equation of state of cobalt oxide: Implications for redox relations in Earth's mantle

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MayJune American Mineralogist 2013

Measured unit cell volumes for sample and standard, average measured temperatures, and inferred pressures from the NaCl standard. NaCl unit cell volumes are the B2 structure unless otherwise indicated (* =B1).

file	NaCl Volume (Å^3)	Uncertainty (Å^3)	NaCl P (GPa)	Uncertainty (GPa)	CoO V (Å^3)	Uncertainty (Å^3)	Sample Temperature (K)	Uncertainty (K)
DAC_I_060*	154.633	0.220	5.91	0.07	75.887	0.042	832	7
DAC_I_061*	154.288	0.266	5.91	0.10	75.862	0.049	759	37
DAC_I_062*	154.223	0.517	5.92	0.18	75.652	0.048	754	39
DAC_I_063*	154.031	0.443	5.90	0.14	75.659	0.150	695	16
DAC_I_067*	142.355	0.276	10.36	0.16	74.510	0.114	700	64
DAC_I_068*	142.355	0.291	10.76	0.23	74.657	0.087	963	118
DAC_I_0	133.4	0.287	16.	0.20	73.4	0.029	1321	42

80*	87		12		45			
DAC_I_081*	133.622	0.528	16.58	0.36	74.281	0.020	1672	63
DAC_I_082*	133.480	0.476	16.27	0.32	73.968	0.021	1416	40
DAC_I_093*	128.158	0.357	20.26	0.30	72.358	0.142	1597	59
DAC_I_094*	128.190	0.408	20.21	0.33	72.279	0.086	1581	48
DAC_I_097*	128.264	0.447	20.12	0.37	72.728	0.139	1560	72
DAC_I_103*	121.224	0.347	26.15	0.47	70.817	0.052	1534	183
DAC_I_105*	121.513	0.400	26.28	0.42	71.215	0.105	1783	70
DAC_I_106*	121.450	0.335	26.57	0.36	71.502	0.078	1920	67
DAC_I_113*	119.355	0.394	27.71	0.46	70.305	0.109	1340	99
DAC_I_114*	119.188	0.436	28.17	0.48	70.341	0.095	1510	40
DAC_I_1	119.0	0.323	28.	0.36	70.3	0.141	1692	41

15*	50		62		74			
DAC_I_116*	118.998	0.289	28.84	0.32	70.490	0.102	1791	20
DAC_I_117*	119.023	0.179	29.35	0.22	70.693	0.256	2111	53
DAC_I_123	27.825	0.002	33.31	0.04	69.395	0.090	1562	22
DAC_I_124	27.927	0.028	32.79	0.16	69.340	0.081	1578	22
DAC_I_133	27.464	0.008	35.67	0.20	68.724	0.181	1738	105
DAC_I_143	27.212	0.010	37.63	0.10	68.580	0.033	1983	38
DAC_I_144	27.136	0.026	38.06	0.19	68.302	0.058	1965	49
DAC_I_154	26.556	0.039	40.35	0.28	67.348	0.258	1234	21
DAC_I_155	26.569	0.035	40.97	0.27	67.495	0.041	1595	52
DAC_I_156	26.635	0.033	41.18	0.25	67.710	0.044	1930	54
DAC_I_1	26.60	0.038	41.	0.28	67.8	0.128	2121	48

57	8		73		15			
DAC_I_158	26.627	0.038	42.01	0.29	67.944	0.097	2329	56
DAC_I_162	26.328	0.025	41.69	0.18	66.289	0.260	1127	1
DAC_I_171	26.018	0.029	43.84	0.23	66.121	0.175	1108	34
DAC_I_172	26.071	0.027	44.38	0.21	66.302	0.155	1569	21
DAC_I_173	26.104	0.024	44.87	0.20	66.679	0.075	1938	42
DAC_I_183	25.819	0.042	45.42	0.33	65.884	0.191	1159	6
DAC_I_184	25.878	0.034	45.54	0.28	66.042	0.188	1441	47
DAC_I_185	25.928	0.034	45.84	0.27	66.178	0.040	1780	29
DAC_I_186	25.960	0.025	46.26	0.21	66.460	0.122	2112	38
DAC_I_189	25.945	0.028	47.15	0.24	66.935	0.143	2500	57
DAC_I_1	25.63	0.050	46.	0.41	65.5	0.212	1197	10

93	5		89		56			
DAC_I_194	25.661	0.046	47.39	0.38	65.651	0.099	1542	36
DAC_I_195	25.672	0.055	47.59	0.46	65.732	0.078	1686	51
DAC_I_196	25.685	0.052	48.11	0.46	65.933	0.042	1994	88
DAC_I_197	25.868	0.003	46.83	0.18	66.214	0.185	2050	89
DAC_I_198	25.690	0.060	48.92	0.53	66.407	0.239	2417	99
DAC_I_199	25.738	0.073	48.34	0.60	66.174	0.127	2314	67
DAC_I_207	25.497	0.032	48.11	0.30	64.867	0.031	1265	65
DAC_I_208	25.525	0.034	47.58	0.29	64.914	0.016	1110	35
DAC_I_209	25.546	0.031	47.67	0.26	64.973	0.036	1238	17
DAC_I_210	25.533	0.046	48.30	0.39	65.098	0.025	1498	33
DAC_I_2	25.53	0.052	48.	0.44	65.1	0.050	1656	11

11	5		60		20			
DAC_I_212	25.547	0.050	48.67	0.42	65.413	0.110	1736	32
DAC_I_213	25.615	0.070	48.69	0.59	65.317	0.048	2012	56
DAC_I_214	25.534	0.058	49.49	0.50	65.507	0.140	2093	59
DAC_I_223	25.299	0.040	49.36	0.35	64.827	0.283	1096	4
DAC_I_224	25.347	0.043	49.43	0.37	64.891	0.164	1323	7
DAC_I_225	25.382	0.058	49.64	0.50	64.975	0.064	1565	39
DAC_I_226	25.417	0.047	49.72	0.40	65.064	0.279	1743	24
DAC_I_229	25.368	0.047	51.50	0.40	65.900	0.162	2424	3
DAC_I_230	25.386	0.055	51.67	0.48	66.026	0.216	2583	57
DAC_I_238	24.552	0.039	56.04	0.39	63.648	0.081	1181	4
DAC_I_2	24.57	0.041	56.	0.40	63.7	0.056	1342	11

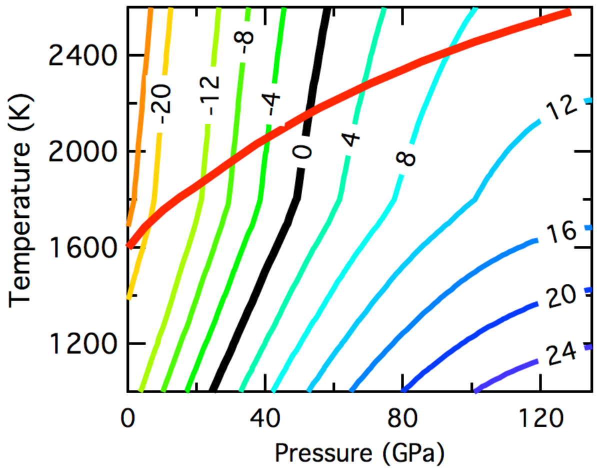
40	8		13		43			
DAC_I_242	24.605	0.037	56.28	0.37	63.778	0.129	1530	41
DAC_I_244	24.709	0.053	56.38	0.51	64.291	0.155	2038	18
DAC_I_245	24.721	0.061	56.21	0.59	64.340	0.142	2005	62
DAC_I_248	24.681	0.072	56.88	0.70	64.448	0.278	2153	48
DAC_I_249	24.801	0.012	56.22	0.14	64.724	0.129	2358	39
DAC_I_250	24.738	0.004	56.71	0.05	64.549	0.206	2321	18
DAC_I_252	24.847	0.081	54.88	0.79	64.305	0.080	1908	107
DAC_I_261	24.136	0.051	60.13	0.53	63.420	0.103	1228	21
DAC_I_262	24.143	0.050	60.55	0.53	63.425	0.105	1461	37
DAC_I_263	24.160	0.038	60.60	0.40	63.399	0.108	1559	24
DAC_I_2	24.19	0.045	60.	0.47	63.4	0.070	1888	22

64	9		91		69			
DAC_I_265	24.193	0.047	61.20	0.50	63.553	0.059	1999	28
DAC_I_266	24.207	0.047	61.08	0.49	63.577	0.057	2006	1
DAC_I_267	24.196	0.045	61.88	0.47	63.693	0.111	2333	46
DAC_I_269	24.177	0.042	61.06	0.44	63.389	0.163	1859	6
DAC_I_270	24.142	0.041	60.93	0.43	63.299	0.141	1629	17
DAC_I_281	23.900	0.052	63.83	0.57	62.713	0.159	1837	37
DAC_I_282	23.894	0.052	64.02	0.59	62.738	0.131	1893	65
DAC_I_283	23.873	0.058	64.26	0.64	62.697	0.101	1908	39
DAC_I_284	23.883	0.056	64.12	0.62	62.737	0.134	1891	27
DAC_I_285	23.911	0.055	64.49	0.62	62.862	0.090	2197	61
DAC_I_2	23.91	0.064	64.	0.71	62.8	0.122	2234	44

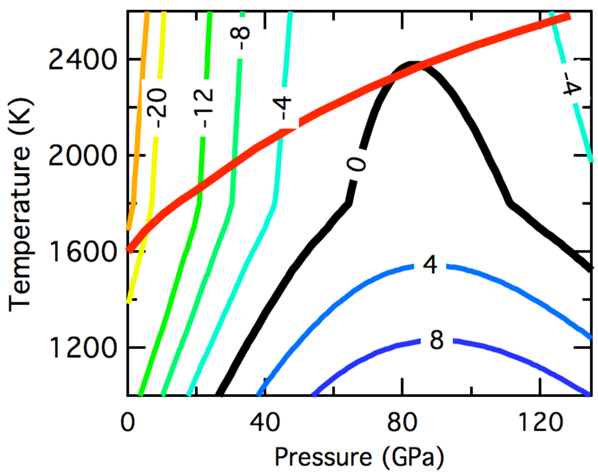
86	3		55		98			
DAC_I_287	24.176	0.037	62.42	0.48	62.978	0.119	2494	128
Touzelin (1978)	-	-	-	-	77.260	0.014	299	5
Touzelin (1978)	-	-	-	-	78.205	0.014	589	5
Touzelin (1978)	-	-	-	-	78.480	0.014	683	5
Touzelin (1978)	-	-	-	-	78.788	0.014	774	5
Touzelin (1978)	-	-	-	-	79.036	0.014	852	5
Touzelin (1978)	-	-	-	-	79.202	0.014	911	5
Touzeli	-	-	-	-	79.4	0.014	980	5

n (1978)					57			
Touzelin (1978)	-	-	-	-	79.596	0.014	1039	5
Touzelin (1978)	-	-	-	-	79.851	0.014	1117	5
Touzelin (1978)	-	-	-	-	80.672	0.014	1326	5
Touzelin (1978)	-	-	-	-	80.818	0.014	1375	5
Touzelin (1978)	-	-	-	-	80.980	0.014	1427	5
Touzelin (1978)	-	-	-	-	81.149	0.014	1476	5
Touzelin	-	-	-	-	81.262	0.014	1527	5

(1978)								



Supplementary Figure 1a. Similar to Figure 4 in the text, but calculated assuming Co metal is more 10% more compressible (K_{0T}=179 GPa). The crossing point with the geotherm lowers by ~10% (to ~53 GPa from ~58 GPa).



Supplementary Figure 1b Similar to Figure 4, but assuming Co metal is 10% less compressible (K_{0T}=219 GPa). The crossing point with the geotherm moves to higher pressures and exhibits