

TABLE S1

Calculation of pressure and force constants for high symmetry crystals

Type	Compound R	$K_b$	$Z_c$	N	s	g	Kobs	Kthec	Kt/Ko	gR/bo.	beta-ob:	beta-the	bt/bo	su(b-obs)	
Al <sub>2</sub> O <sub>3</sub>	V <sub>2</sub> O <sub>3</sub>	2.01	180	3	6	0.5	1.38	11.3	15	1.32	132.5	0.0019	0.0019	1.00	15
Al <sub>2</sub> O <sub>3</sub>	Cr <sub>2</sub> O <sub>3</sub>	1.99	230	3	6	0.5	1.38	11.3	15.2	1.34	167.6	0.0014	0.0018	1.25	15
Al <sub>2</sub> O <sub>3</sub>	Fe <sub>2</sub> O <sub>3</sub>	1.98	230	3	6	0.5	1.38	11.3	15.3	1.35	166.8	0.0014	0.0018	1.23	15
Al <sub>2</sub> O <sub>3</sub>	Al <sub>2</sub> O <sub>3</sub>	1.91	240	3	6	0.5	1.38	11.3	16.1	1.42	167.8	0.0014	0.0016	1.18	15
CaF <sub>2</sub>	BaF <sub>2</sub>	2.68	57	2	8	0.25	1.15	3.52	3.41	0.97	149.8	0.0058	0.009	1.55	7
CaF <sub>2</sub>	PbF <sub>2</sub>	2.57	61	2	8	0.25	1.15	3.52	3.65	1.04	153.7	0.0055	0.0081	1.48	7
CaF <sub>2</sub>	CaF <sub>2</sub>	2.36	86	2	8	0.25	1.15	3.52	4.17	1.19	199	0.0039	0.0065	1.68	7
CaF <sub>2</sub>	SrF <sub>2</sub>	2.51	70	2	8	0.25	1.15	3.52	3.79	1.08	172.3	0.0048	0.0076	1.60	7
CaF <sub>2</sub>	UO <sub>2</sub>	2.37	230	4	8	0.5	1.15	11.3	11.7	1.04	166.3	0.0014	0.0023	1.60	5
CaF <sub>2</sub>	ThO <sub>2</sub>	2.42	193	4	8	0.5	1.15	11.3	11.3	1	142.5	0.0017	0.0025	1.42	5
CsCl	ThCl	3.32	24	1	8	0.125	0.58	0.99	0.84	0.85	137.3	0.0141	0.0228	1.62	5
CsCl	CsCl	3.57	18	1	8	0.125	0.58	0.99	0.74	0.75	113.9	0.0183	0.0278	1.52	5
CsCl	ThBr	3.43	23	1	8	0.125	0.58	0.99	0.8	0.8	135.3	0.0148	0.0249	1.68	5
CsCl	CsI	3.95	13	1	8	0.125	0.58	0.99	0.62	0.63	89.31	0.0258	0.0368	1.42	5
CsCl	CsBr	3.71	16	1	8	0.125	0.58	0.99	0.7	0.7	100.8	0.0215	0.0309	1.44	5
NaCl	BaO	2.776	69	2	6	0.333	1	5.8	4.96	0.86	99.16	0.0048	0.0056	1.16	5
NaCl	CoO	2.133	185	2	6	0.333	1	5.8	7.48	1.29	204.3	0.0018	0.0029	1.58	5
NaCl	CaO	2.406	110	2	6	0.333	1	5.8	6.23	1.08	137	0.003	0.0039	1.27	5
NaCl	SrO	2.58	91	2	6	0.333	1	5.8	5.58	0.96	121.5	0.0037	0.0046	1.26	5
NaCl	GaP	2.736	89	3	6	0.5	1	11.3	9.33	0.82	64.61	0.0037	0.0029	0.78	5
NaCl	SrTe	3.235	33	2	6	0.333	1	5.8	3.84	0.66	55.93	0.01	0.0084	0.84	5
NaCl	CaTe	3.178	42	2	6	0.333	1	5.8	3.96	0.68	69.1	0.0079	0.008	1.01	5
NaCl	LiF	2.023	66	1	6	0.167	1	1.69	2.85	1.69	236.5	0.0051	0.0071	1.40	5
NaCl	NaF	2.31	45	1	6	0.167	1	1.69	2.35	1.39	184.1	0.0074	0.0098	1.33	5
NaCl	KF	2.674	29	1	6	0.167	1	1.69	1.86	1.1	138.8	0.0114	0.0144	1.26	5
NaCl	RbF	2.82	27	1	6	0.167	1	1.69	1.71	1.01	136.4	0.0122	0.0165	1.35	5
NaCl	LiCl	2.565	32	1	6	0.167	1	1.69	1.99	1.18	143.1	0.0106	0.0129	1.22	5
NaCl	NaCl	2.814	24	1	6	0.167	1	1.69	1.71	1.01	119.6	0.0139	0.0164	1.18	5
NaCl	KCl	3.146	18	1	6	0.167	1	1.69	1.42	0.84	100.3	0.0185	0.0221	1.19	5
NaCl	RbCl	3.291	16	1	6	0.167	1	1.69	1.32	0.78	93.28	0.0208	0.025	1.20	5
NaCl	LiBr	2.75	26	1	6	0.167	1	1.69	1.78	1.05	125.2	0.013	0.0154	1.19	5
NaCl	NaBr	2.989	20	1	6	0.167	1	1.69	1.55	0.92	105.9	0.0167	0.0193	1.16	5
NaCl	KBr	3.264	15	1	6	0.167	1	1.69	1.34	0.79	87.89	0.0219	0.0244	1.11	5
NaCl	RbBr	3.427	14	1	6	0.167	1	1.69	1.23	0.73	83.78	0.0242	0.0279	1.15	5
NaCl	Lil	3	19	1	6	0.167	1	1.69	1.54	0.91	99.91	0.0177	0.0195	1.10	5
NaCl	NaI	3.236	16	1	6	0.167	1	1.69	1.36	0.8	92.29	0.0207	0.0239	1.15	5
NaCl	KI	3.533	12	1	6	0.167	1	1.69	1.17	0.69	77.61	0.0269	0.0303	1.13	5
NaCl	RbI	3.671	11	1	6	0.167	1	1.69	1.09	0.64	72.18	0.03	0.0336	1.12	5
NaCl	TiC	2.159	190	4	6	0.667	1	17.6	20.8	1.18	69.75	0.0018	0.001	0.59	5
NaCl	UC	2.48	160	4	6	0.667	1	17.6	16.8	0.95	67.47	0.0021	0.0015	0.71	5
NaCl	BaTe	3.493	31	2	6	0.333	1	5.8	3.37	0.58	55.15	0.0109	0.0104	0.95	5
NaCl	MnO	2.222	143	2	6	0.333	1	5.8	7.04	1.21	164.5	0.0023	0.0032	1.35	5
NaCl	KCN	3.263	14	1	6	0.167	1	1.69	1.34	0.79	82.66	0.0233	0.0244	1.05	5
NaCl	InP	2.934	73	3	6	0.5	1	11.3	8.31	0.74	56.83	0.0046	0.0035	0.77	5
NaCl	CaS	2.845	43	2	6	0.333	1	5.8	4.76	0.82	63.33	0.0078	0.006	0.77	5
NaCl	FeO	2.139	153	2	6	0.333	1	5.8	7.45	1.29	169.4	0.0022	0.0029	1.32	5
NaCl	InAs	3.018	58	3	6	0.5	1	11.3	7.93	0.7	46.45	0.0057	0.0038	0.66	5
NaCl	MgO	2.106	161	2	6	0.333	1	5.8	7.62	1.31	175.5	0.0021	0.0028	1.34	5
NaCl	NiO	2.084	196	2	6	0.333	1	5.8	7.74	1.33	211.4	0.0017	0.0027	1.58	5
NaCl	BaS	3.194	35	2	6	0.333	1	5.8	3.92	0.68	57.87	0.0095	0.0081	0.85	5
NaCl	GaAs	2.827	75	3	6	0.5	1	11.3	8.84	0.78	56.26	0.0044	0.0032	0.72	5
NaCl	TaC	2.227	220	4	6	0.667	1	17.6	19.8	1.12	83.31	0.0015	0.0011	0.74	5
NaCl	InSb	3.239	47	3	6	0.5	1	11.3	7.04	0.62	40.39	0.0071	0.0046	0.65	5
NaCl	PbSe	3.062	34	2	6	0.333	1	5.8	4.21	0.73	53.89	0.0098	0.0073	0.74	5
NaCl	ZrC	2.341	190	4	6	0.667	1	17.6	18.4	1.04	75.63	0.0018	0.0013	0.73	5
NaCl	GaSb	3.059	56	3	6	0.5	1	11.3	7.75	0.69	45.45	0.006	0.0039	0.66	5
NaCl	SrS	3.01	40	2	6	0.333	1	5.8	4.34	0.75	62.33	0.0083	0.0069	0.83	5



Table S2 Bond distances at different pressures

				Observed bond lengths					Calculated bond lengths									
FeTiO3	P(GPa)	su	0.0001	2.54	3.46	4.61		S	Ro									
30670	Fe-O	0.002	2.0784	2.0672	2.065	2.052		0.39	1.734	2.0784	2.067	2.063	2.058					-0.53
	Fe-O	0.002	2.201	2.184	2.176	2.18		0.28	1.734	2.201	2.179	2.171	2.161					-0.27
	Ti-O	0.002	1.874	1.872	1.868	1.869		0.85	1.815	1.874	1.872	1.871	1.87					-0.42
	Ti-O	0.002	2.087	2.076	2.072	2.072		0.48	1.815	2.087	2.079	2.076	2.072					-0.41
SiO2			0.0001	2.07	3.76	4.86	5.58	6.14										
100341	Si-O	0.003	1.605	1.604	1.601	1.601	1.6	1.603	1.05	1.624	1.605	1.604	1.603	1.603	1.603	1.602		-0.82
	Si-O	0.002	1.614	1.611	1.61	1.609	1.611	1.607	1.03	1.624	1.614	1.613	1.612	1.612	1.612	1.611		-0.47
CaMg(CO3)2		dolomite	0.0001	1.5	2.9	3.7	4.69											
66333	Ca-O	0.002	2.381	2.364	2.354	2.345	2.339		0.33	1.967	2.381	2.367	2.354	2.347	2.338			
	Mg-O	0.003	2.081	2.073	2.06	2.053	2.048		0.35	1.693	2.081	2.073	2.066	2.062	2.057			
	C-O	0.003	1.287	1.284	1.283	1.286	1.283		1.24	1.366	1.287	1.287	1.286	1.286	1.286			
Ni2SiO4			0.0001	1.12	2.25	3.1	3.65	3.82										
200129	Ni-O	0.003	2.061	2.057	2.053	2.05	2.046	2.041	0.33	1.654	2.061	2.055	2.049	2.044	2.041	2.04		
	Si-O	0.003	1.657	1.655	1.654	1.653	1.657	1.663	0.91	1.624	1.657	1.656	1.656	1.655	1.655	1.655		
Mg3Al2(SiO4)3		pyrope	1.6	1.6	3.1	4.3	5.6											
100614	Mg-O	0.004	2.188	2.188	2.187	2.181	2.156		0.26	1.693	2.188	2.188	2.174	2.162	2.15			
	Mg-O	0.004	2.341	2.341	2.323	2.32	2.307		0.17	1.693	2.341	2.341	2.307	2.28	2.251			
	Al-O	0.005	1.875	1.875	1.861	1.869	1.863		0.5	1.62	1.875	1.875	1.872	1.869	1.867			
	Si-O	0.004	1.626	1.626	1.633	1.619	1.626		0.99	1.624	1.626	1.626	1.625	1.625	1.624			
Al2O3	(finger)	corundum	0.0001	1.1	2.1	2.8	3.5	4.6										
9770	Al-O	0.002	1.856	1.854	1.852	1.848	1.846	1.844	0.53	1.62	1.856	1.854	1.852	1.851	1.849	1.847		
	Al-O	0.002	1.971	1.966	1.963	1.965	1.966	1.962	0.39	1.62	1.971	1.967	1.963	1.961	1.958	1.954		
BeO		bromellite	0.0001	1.1	2.2	3.8	4	5										
62726	Be-O	0.002	1.646	1.644	1.639	1.637	1.634	1.634	0.49	1.381	1.646	1.644	1.643	1.641	1.64	1.639		
	Be-O	0.005	1.656	1.652	1.653	1.647	1.654	1.643	0.48	1.381	1.656	1.654	1.653	1.65	1.65	1.648		
ZrSiO4		zircon	0.98	1.74	2.32	2.89	3.71	4.81										
100239	Zr-O		2.127	2.128	2.119	2.115	2.115	2.112	0.58	1.928	2.127	2.125	2.124	2.122	2.12	2.117		
	Zr-O		2.27	2.266	2.263	2.264	2.264	2.258	0.4	1.928	2.27	2.266	2.262	2.259	2.254	2.248		
	Si-O		1.616	1.611	1.62	1.619	1.613	1.611	1.02	1.624	1.616	1.616	1.615	1.615	1.615	1.614		

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