

**Appendix Table 1.** Cell parameters and volumes of anhydrous forsterite as functions of temperature

$T$ (K)	$a$ (Å)	$b$ (Å)	$c$ (Å)	$V$ (Å <sup>3</sup> )
153	4.7522(3)	10.1853(5)	5.9759(4)	289.25(2)
203	4.7534(5)	10.1872(9)	5.9773(6)	289.45(6)
253	4.7548(5)	10.1915(9)	5.9804(6)	289.80(6)
300	4.7558(6)	10.1975(12)	5.9824(4)	290.12(7)
350	4.7563(5)	10.2056(12)	5.9887(8)	290.70(6)
396	4.7574(6)	10.2107(15)	5.9918(10)	291.06(7)
443	4.7601(4)	10.2179(9)	5.9940(5)	291.54(4)
489	4.7616(4)	10.2252(9)	5.9977(6)	292.02(4)
537	4.7647(3)	10.2336(7)	6.0002(4)	292.57(3)
586	4.7665(5)	10.2396(10)	6.0021(6)	292.94(4)
635	4.7683(4)	10.2477(8)	6.0087(5)	293.61(3)
685	4.7701(5)	10.2533(13)	6.0135(8)	294.12(6)
736	4.7729(6)	10.2624(13)	6.0139(8)	294.57(6)
787	4.7758(4)	10.2708(8)	6.0207(5)	295.32(3)
839	4.7785(5)	10.2789(12)	6.0222(8)	295.80(5)
889	4.7806(4)	10.2873(8)	6.0297(5)	296.53(3)

**Appendix Table 2.** Cell parameters and volumes of hydrous forsterite as functions of temperature.

$T$ (K)	$a$ (Å)	$b$ (Å)	$c$ (Å)	$V$ (Å <sup>3</sup> )
133	4.7507(3)	10.1934(4)	5.9790(4)	289.54(2)
173	4.7509(2)	10.1962(5)	5.9802(3)	289.69(2)
223	4.7522(3)	10.2004(6)	5.9819(3)	289.97(2)
300	4.7544(3)	10.2084(5)	5.9872(3)	290.59(2)
350	4.7572(4)	10.2169(9)	5.9899(5)	291.13(3)
396	4.7587(4)	10.2241(9)	5.9931(5)	291.58(3)
443	4.7602(3)	10.2297(7)	5.9969(4)	292.02(2)
489	4.7625(3)	10.2345(8)	5.9997(4)	292.44(3)
537	4.7642(4)	10.2421(8)	6.0029(5)	292.92(3)
586	4.7662(4)	10.2489(9)	6.0061(5)	293.39(3)
635	4.7688(4)	10.2573(11)	6.0099(5)	293.97(4)
685	4.7724(4)	10.2630(10)	6.0129(11)	294.51(5)
736	4.7759(3)	10.2729(10)	6.0172(11)	295.22(5)
787	4.7788(3)	10.2806(9)	6.0220(10)	295.85(4)
839	4.7818(3)	10.2903(7)	6.0272(8)	296.57(4)
889	4.7850(3)	10.3001(7)	6.0327(9)	297.33(4)
919	4.7866(1)	10.294(5)	6.0328(3)	297.26(17)

**Appendix Table 3.** Cell parameters and volumes of anhydrous wadsleyite as functions of temperature

$T$ (K)	$a$ (Å)	$b$ (Å)	$c$ (Å)	$V$ (Å <sup>3</sup> )
153	5.6969(5)	11.4387(11)	8.2476(16)	537.46(10)
203	5.6976(5)	11.4414(10)	8.2496(15)	537.78(9)
253	5.6990(4)	11.4432(10)	8.2536(13)	538.26(8)
303	5.7007(5)	11.4456(10)	8.2580(13)	538.81(7)
323	5.6994(6)	11.4525(13)	8.2606(10)	539.36(9)
368	5.7018(5)	11.4595(12)	8.2622(10)	539.85(10)
415	5.7034(6)	11.4593(13)	8.2713(17)	540.59(12)
461	5.7054(6)	11.4630(12)	8.2765(16)	541.29(12)
508	5.7074(4)	11.4651(9)	8.2813(10)	541.90(7)
557	5.7090(5)	11.4686(10)	8.2853(13)	542.47(9)
606	5.7111(5)	11.4728(11)	8.2921(13)	543.32(10)
655	5.7140(5)	11.4776(10)	8.2977(11)	544.19(8)

705	5.7164(5)	11.4847(10)	8.3037(11)	545.00(8)
756	5.7190(5)	11.4873(10)	8.3108(11)	545.99(8)
808	5.7219(4)	11.4914(9)	8.3168(10)	546.85(7)

**Appendix Table 4.** Cell parameters and volumes of hydrous wadsleyite as functions of temperature.

$T$ (K)	$a$ (Å)	$b$ (Å)	$c$ (Å)	$V$ (Å <sup>3</sup> )
153	5.6779(8)	11.5118(19)	8.2393(20)	538.53(15)
203	5.6794(7)	11.5111(18)	8.2447(18)	539.01(15)
253	5.6796(9)	11.5162(21)	8.2461(22)	539.35(9)
303	5.6803(7)	11.5235(15)	8.2503(11)	540.05(9)
323	5.6813(3)	11.5250(8)	8.2512(5)	540.27(5)
368	5.6832(3)	11.5296(8)	8.2547(5)	540.89(5)
415	5.6849(4)	11.5338(8)	8.2610(6)	541.66(6)
461	5.6876(3)	11.5393(8)	8.2678(6)	542.62(6)
508	5.6909(4)	11.5455(10)	8.2786(7)	543.94(7)
557	5.6927(3)	11.5525(8)	8.2851(6)	544.87(6)
606	5.6941(6)	11.5641(15)	8.2872(10)	545.69(10)
655	5.7027(15)	11.5566(34)	8.2870(21)	546.14(21)
705	5.7115(8)	11.5179(20)	8.2951(12)	545.68(12)
756	5.7189(7)	11.4969(20)	8.3078(13)	546.23(10)

**Appendix Table 5.** Cell parameters and volumes of ringwoodite I, II, and III.  
Ringwoodite I: Ringwoodite II:

$T$ (K)	$a$ (Å)	$V$ (Å <sup>3</sup> )
133	8.0583(5)	523.27(12)
153	8.0589(5)	523.41(10)
203	8.0605(5)	523.70(10)
253	8.0624(5)	524.06(10)
303	8.0666(4)	524.89(9)
323	8.0674(4)	525.04(9)
368	8.0703(4)	525.61(8)
415	8.0729(4)	526.12(8)
461	8.0765(4)	526.83(8)
508	8.0801(4)	527.53(8)
557	8.0841(4)	528.32(8)
606	8.0878(4)	529.04(8)
655	8.0916(4)	529.79(7)
705	8.0972(4)	530.89(8)
756	8.1022(4)	531.87(8)
808	8.1068(5)	532.77(10)
859	8.1128(4)	533.97(8)
911	8.1282(25)	537.01(50)
$T$ (K)	$a$ (Å)	$V$ (Å <sup>3</sup> )
133	8.0613(3)	523.86(6)
153	8.0623(4)	524.05(8)
203	8.0637(2)	524.34(5)
253	8.0660(3)	524.78(6)
303	8.0694(4)	525.45(7)
323	8.0706(3)	525.67(7)
368	8.0739(4)	526.32(8)
415	8.0766(4)	526.84(8)
461	8.0806(3)	527.63(7)
508	8.0847(4)	528.43(8)

557	8.0883(3)	529.15(6)
606	8.0921(3)	529.88(5)
655	8.0975(3)	530.95(6)
685	8.1030(3)	532.03(6)
715	8.1073(3)	532.88(6)
746	8.1116(3)	533.72(6)
777	8.1150(3)	534.41(6)
808	8.1218(6)	535.75(12)
838	8.1294(10)	537.26(19)

Ringwoodite III:

$T$ (K)	$a$ (Å)	$V$ (Å <sup>3</sup> )
133	8.0762(8)	526.76(16)
153	8.0765(7)	526.83(14)
203	8.0786(4)	527.24(8)
253	8.0809(5)	527.68(10)
303	8.0833(3)	528.16(6)
323	8.0853(4)	528.55(8)
368	8.0884(4)	529.16(7)
415	8.0933(4)	530.12(7)
461	8.0975(4)	530.95(7)
508	8.1028(4)	531.98(7)
557	8.1070(3)	532.82(7)
606	8.1175(5)	534.90(10)
655	8.1272(5)	536.82(9)
705	8.1375(4)	538.85(8)
756	8.1494(6)	541.23(12)
808	8.1670(7)	544.73(13)
859	8.1775(10)	546.84(21)