

**Supporting Information for**

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**Oxygen vacancy substitution linked to ferric iron in bridgmanite  
at 27 GPa.**

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This Supporting Information file contains:

- Table S1. Chemical composition of  $\text{MgFe}_2\text{O}_4$  analyzed by EPMA.
- Table S2. Chemical composition of  $(\text{Mg,Fe})\text{O}$  analyzed by EPMA.

**Table S1:** Chemical composition of  $\text{MgFe}_2\text{O}_4$  analyzed by EPMA. The atomic values are calculated with  $\text{O} = 24$ . The weight fractions are obtained by assuming 100%  $\text{Fe}^{3+}$ .

Starting	Run.	Mg(atomic)	Si(atomic)	Fe(atomic)	MgO(wt.%)	SiO <sub>2</sub> (wt.%)	Fe <sub>2</sub> O <sub>3</sub> (wt.%)	Total(wt.%)
MgO-rich	I567	7.65 (12)	0.63 (2)	15.09 (13)	19.50 (35)	2.39 (8)	76.16 (69)	98.05 (59)
	I574	7.66 (7)	0.75 (2)	14.87 (8)	19.82 (34)	2.85 (9)	76.25 (95)	98.92 (119)
	I580	8.03 (12)	0.18 (10)	15.62 (23)	20.43 (44)	0.67 (39)	78.65 (75)	99.74 (72)
	I597	8.01 (8)	0.19 (1)	15.62 (7)	19.94 (21)	0.69 (5)	77.08 (43)	97.71(38)
Fe <sub>2</sub> O <sub>3</sub> -rich	I567	6.81 (20)	0.52 (3)	16.15 (23)	17.13 (65)	1.94 (11)	80.39 (62)	99.46 (60)
	I574	6.77 (11)	0.56 (2)	16.10 (10)	16.98 (37)	2.11 (7)	79.99 (50)	99.09 (67)
	I597	5.27 (45)	0.27 (10)	18.19 (58)	12.64 (124)	0.96 (38)	86.25 (161)	99.85 (80)
	I681	6.47 (6)	1.18 (3)	15.18 (7)	16.86 (22)	4.59 (10)	78.42 (48)	99.87 (57)
	I646	7.08 (15)	1.19 (6)	14.55 (21)	18.23 (50)	4.55 (23)	74.25 (137)	97.04 (140)

**Table S2:** Chemical composition of (Mg,Fe)O analyzed by EPMA. The atomic values are calculated with O = 24. The weight fractions are obtained by assuming 100% Fe<sup>2+</sup>.

Starting	Run.	Mg(atomic)	Si(atomic)	Fe(atomic)	MgO(wt.%)	SiO <sub>2</sub> (wt.%)	FeO(wt.%)	Total(wt.%)
MgO-rich	I567	22.66 (5)	0.01 (1)	1.32 (4)	92.15 (51)	0.04 (3)	9.59 (38)	101.78 (84)
	I574	22.36 (11)	0.04 (3)	1.56 (6)	89.75 (117)	0.25 (17)	11.17 (36)	101.16 (85)
	I580	23.61 (12)	0.01 (1)	0.38 (12)	97.09 (206)	0.05 (3)	2.77 (91)	99.91 (221)
	I597	23.53 (2)	0.00 (1)	0.46 (2)	92.74 (173)	0.01 (1)	3.26 (17)	96.01 (190)