The Parameters used for MgO

EoS	V_o [cm^3]	K_o [GPa]	α_o $[\times 10^{-5} K^{-1}]$	a	b $[\times 10^{-3}]$	c $[\times 10^{-7}]$	d $[\times 10^{-10}]$	f	g $[\times 10^{-9}]$
Garai	11.142	165.15	2.957	1.721	-2.249	-2.0903	4.4	10.3	6.903

The Equation of State used here is:

$$V = nV_o e^{\frac{-p}{ap+bp^2+K_o}+\left(\alpha_o+cp+dp^2\right)T+\left(1+\frac{cp+dp^2}{\alpha_o}\right)^f gT^2} \tag{1}$$

where, a is a linear, b is a quadratic term for the pressure dependence of the bulk modulus, c is a linear and d is a quadratic term for the pressure dependence of the volume coefficient of thermal expansion and f and g are parameters describing the temperature dependence of the volume coefficient of thermal expansion. The theoretical explanations for Eq. (1) and the physics of the parameters are discussed in detail [1]. The equation has an analytical solution for the temperature

$$T=\frac{-\left(\alpha_o+cp+dp^2\right)\pm\sqrt{\left(\alpha_o+cp+dp^2\right)^2+4g\left(1+\frac{cp+dp^2}{\alpha_o}\right)^f\left[\ln\left(\frac{V}{V_o}\right)+\frac{p}{ap+bp^2+K_o}\right]}}{2g\left(1+\frac{cp+dp^2}{\alpha_o}\right)^f} \qquad (2)$$

The pressure is determined by repeated substitutions as:

$$p=\lim_{n\to\infty} f^n(p) \qquad (3)$$

where

$$f^n(p)=\left(K_o+ap_{n-1}+bp_{n-1}^2\right)\left[\left(\alpha_o+cp_{n-1}+dp_{n-1}^2\right)T+\left(1+\frac{cp_{n-1}+dp_{n-1}^2}{\alpha_o}\right)^f gT^2-\ln\left(\frac{V}{V_o}\right)\right] \qquad (4)$$

$n\in\mathbb{N}^*$ and $p_0=0$

The convergence of Equation (4) depends on pressure. For the maximum pressure used in this study (up to 140 GPa) n = 15 is sufficient. The maximum convergence error $[\varepsilon]$ for the investigated data set is 0.05 GPa where

$$\varepsilon\geq\left|f^{15}(p)-f^{14}(p)\right|. \qquad (5)$$

Reference: [1] J. Garai, J. Applied Phys., 102 (2007) 123506.