Mixing properties of aluminosilicate garnets: constraints from natural and experimental data, and applications to geothermo-barometry: Clarifications

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In this paper (Ganguly and Saxena, 1984) we have developed a restricted formulation for garnet–biotite geothermometry by introducing certain corrections for compositional effects on the $K_0(\text{Fe–Mg})$ vs. $T$ calibration of Ferry and Spear (1978) in the Fe–Mg system. To use this formulation, one needs to evaluate, according to (14), the compositionally dependent interaction parameter $W_{\text{FeMg}}$ in equations (12) and (13) for the garnet composition in the sample of interest and for that (Al$_{90}$Py$_{10}$) maintained in the experimental work of Ferry and Spear, respectively. Thus, $W_{\text{FeMg}}$ (eqn. 13) $\approx$ 2270 cal, and consequently, the term $A$ (eqn. 12) $\approx$ 1175 + 9.45 $P$(kbar). The term $W_{\text{Al}}$ in equation (12) is to be read as $\Delta W_{\text{Al}}$.

The $W$ parameters in equations (A.1) and (A.2) in the Appendix are $W_{\text{G}}$’s (see eqn. 5). The equation (A.3) is for 1 bar, $T \cdot R \ln \gamma_{\text{G}}(\text{Gt})$ at $P > 1$ bar can be calculated through the relation $RT \partial \ln \gamma_{\text{G}}/\partial P = (\bar{V}_{\text{G}} - V_{\text{G}})$. The volume data for grossular are given in Newton and Haselton (1981), and those for pyrope in Haselton and Newton (1980).

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References