Appendix A. A Hybrid Model for Amphibole-Melt REE Partitioning

Following the same procedure outlined in the parameterization method, we found a hybrid model in which parameters D_0, r_0, and E take on the following expressions:

$$\ln D_0^{\mathrm{amph}} = 3.17(\pm 0.71) - 0.61(\pm 0.10) X_{\mathrm{Si}}^{\mathrm{amph}} - 2.19(\pm 0.20) X_{\mathrm{Na}}^{\mathrm{amph}} - 1.95(\pm 0.32) X_{\mathrm{K}}^{\mathrm{amph}} + 0.89(\pm 0.29) \ln\left(X_{\mathrm{Si}}^{\mathrm{melt}}\right) - 1.21(\pm 0.07) \ln\left(X_{\mathrm{Ca}}^{\mathrm{melt}}\right), \quad \text{, (A1)}$$

$$r_0^{\mathrm{amph}} = 1.044(\pm 0.002) - 0.050(\pm 0.008) X_{\mathrm{Fm}}^{\mathrm{amph\text{-}M4}}, \quad \text{(A2)}$$

$$E^{\mathrm{amph}} = 332(\pm 15), \quad \text{(A3)}$$

where r_0 is in Å; and E is in GPa; and numbers in parentheses are 2σ uncertainties estimated directly from the simultaneous inversion. The hybrid model has 9 fitting parameters and provides an improved fit (χ_p^2 = 31.5) over the melt (7 fitting parameters) and mineral composition (9 fitting parameters) models presented in the main text. It can be used to predict REE partition coefficients if major element compositions of both amphibole and melt composition are available.