

Trace-element partitioning between alkali feldspar and peralkalic quartz trachyte to rhyolite magma. Part I: Systematics of trace-element partitioning

JOHN CHARLES WHITE,* GREG S. HOLT, DON F. PARKER, AND MINGHUA REN

Department of Geology, Baylor University, Waco, Texas 76798, U.S.A.

ABSTRACT

New alkali feldspar/felsic magma trace-element partition coefficients (D -values) for Rb, Sr, Ba, Eu, Y, Zr, Nb, Ga, Zn, trivalent REE, Be, Cs, Hf, Pb, Th, and U for 30 samples of peralkalic quartz trachyte and rhyolite are presented. D -values of incompatible elements vary systematically with melt polymerization parameters, increasing with whole-rock silica, but decreasing in rocks with higher agpaitic indices [A.I. = mol (Na + K)/Al]. D -values for Sr and Ba (evaluated to be accurate) vary systematically with crystal chemistry, probably substituting for Na in the Ca-poor alkali feldspar phases. Apparent D -values for Sr and Ba from pre-Quaternary systems are fraught with contamination and analytical errors, respectively, and should be used with caution. D_{Eu} decreases exponentially with A.I., ranging from compatible in weakly peralkalic (A.I. < 1.1) rocks to strongly incompatible in very peralkalic (A.I. > 1.2) rocks. These regular variations strongly suggest that partition coefficients for these elements may be predicted accurately if whole-rock and crystal-chemical parameters are known.