

Thermodynamic properties of tremolite: A correction and some comments

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ABSTRACT

Microprobe analysis of tremolite from “St. Gotthard,” Switzerland, shows that it is close to end-member in composition ($\text{Ca} = 1.97$ apfu), and not hypercalcic ($\text{Ca} = 2.16$ apfu), as a previous wet-chemical analysis suggested. The latter formula, and a corresponding thermodynamic activity (0.67), were used in the experimental database for the extraction of an optimal set of thermodynamic properties for tremolite (Chernosky et al. 1998). We derive a revised enthalpy of formation of tremolite (-12307.9 kJ/mol) based on bracketing experiments for the breakdown reactions of tremolite and tremolite + forsterite, and the assumption of time-averaged effective equilibrium compositions of phases in the experimental charges. Mg-cummingtonite substitution in tremolite is accommodated during free-energy minimization calculations by allowing the stoichiometry of the standard-state reaction to vary with the changing bulk composition of the amphibole. The breakdown temperature of tremolite is lowered with increasing cummingtonite component. Our procedure also allows continuous variation in the equilibrium compositions and activities of pyroxene and amphibole phase-components with P and T .