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Thermodynamic mixing properties of Rb-K feldspars

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Abstract

Hydrofluoric acid solution calorimetric measurements conducted at 50 °C on a series of Al-Si ordered Rb-K feldspars reveal that the enthalpies Rb-K mixing (H_{ex}) for this series are positive, with maximum values skewed toward Rb-rich compositions. However, the magnitudes of H_{ex} are greatly reduced relative to those for Na-K feldspars, as are the positive volumes of Rb-K mixing observed for this series. Both observations can be explained by the substitution of two ions that are relatively similar in size. The difficulty in synthesizing Rb-rich sanidine via Rb-exchange of K-sanidine, contrasted with the ability to synthesize rubicline from K-microcline by such exchange, together with a vanishingly small ΔV between ordered rubicline and disordered Rb-sanidine suggest that the volume of Rb-feldspar is close to the limit to which the feldspar structure can be expanded at 1 bar.

Keywords: Rb-K feldspars, solution calorimetric data, thermodynamics, mixing properties