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Volumes of K-Na mixing for low albite–microcline crystalline solutions at elevated temperature: A test of regular solution thermodynamic models

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ABSTRACT

High-temperature volumes of K-Na mixing have been investigated for a seven-member low albite–microcline ion-exchange series by conducting X-ray powder diffraction measurements from room temperature to approximately 1000 °C using Guinier techniques. Volume expansion is a linear function of temperature for all series members and is due mainly to the lengthening of the *a* unit-cell axis, although some expansion of *b* and *c* occurs for relatively sodic members. The maximum expansion possible for each feldspar is determined both by chemistry and temperature, thus $\Delta V/\Delta T$ slopes are steepest for the sodic third of the series, then decrease abruptly for increasingly potassic feldspars. Volumes of K-Na mixing for this series are essentially constant with temperature, regardless of the mixing model utilized, and thus are adequately represented by regular solution thermodynamic models.