

**High temperature phase transitions in synthetic  
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High temperature phase transitions in synthetic RbGaSi<sub>2</sub>O<sub>6</sub> and RbFeSi<sub>2</sub>O<sub>6</sub> leucite analogues.

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Leucite (KAlSi<sub>2</sub>O<sub>6</sub>) [1] is a tetrahedrally coordinated silicate framework mineral. Synthetic analogues of leucite can be synthesised with stoichiometries of  $A^{+2}B^{2+}Si_5O_{12}$  or  $A^{+}C^{3+}Si_2O_6$ , some of the silicon framework cations partially replaced by divalent (*B*) or trivalent (*C*) cations. A monovalent extraframework alkali metal (*A*) cation is also incorporated in these structures to balance the charges. Ambient temperature structures of synthetic anhydrous leucite analogues (where *A* = K or Rb and *C* = Al, Ga or Fe<sup>3+</sup>) all have *I*4<sub>1</sub>/*a* tetragonal structures [1-5] with **disordered** tetrahedrally coordinated sites (T-sites).

On heating these tetragonal leucites can undergo phase transitions to *Ia*-3*d* cubic. Phase transitions have been reported for KCSi<sub>2</sub>O<sub>6</sub> [2, 4] and RbAlSi<sub>2</sub>O<sub>6</sub> [4]. Two more *I*4<sub>1</sub>/*a* tetragonal to *Ia*-3*d* cubic phase transitions are reported after high temperature X-ray powder diffraction studies on RbGaSi<sub>2</sub>O<sub>6</sub> (773K) and RbFeSi<sub>2</sub>O<sub>6</sub> (673K).

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