

**High temperature phase transitions in synthetic
RbGaSi₂O₆ and RbFeSi₂O₆ leucite analogues**

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Citation:

BELL, Anthony (2022). High temperature phase transitions in synthetic RbGaSi₂O₆ and RbFeSi₂O₆ leucite analogues. In: British Crystallographic Association Spring Meeting, Leeds, UK, 11-14 Apr 2022. British Crystallographic Association. (Unpublished) [Conference or Workshop Item]

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High temperature phase transitions in synthetic RbGaSi₂O₆ and RbFeSi₂O₆ leucite analogues.

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Leucite (KAlSi₂O₆) [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 Fe³⁺) all have *I*4₁/*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 KCSi₂O₆ [2, 4] and RbAlSi₂O₆ [4]. Two more *I*4₁/*a* tetragonal to *Ia*-3*d* cubic phase transitions are reported after high temperature X-ray powder diffraction studies on RbGaSi₂O₆ (773K) and RbFeSi₂O₆ (673K).

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