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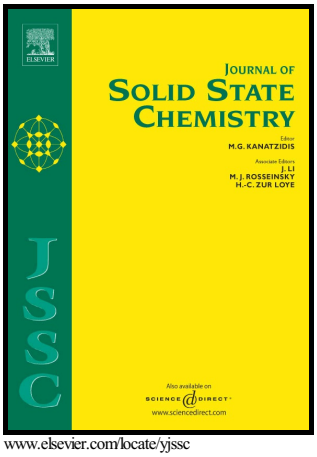

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L.L. Driscoll[1], E. Kendrick[1,2], A. J. Wright[1] and P.R. Slater[1*]

1) School of Chemistry, University of Birmingham, Edgbaston, Birmingham, West Midlands B15 2TT
2) Sharp Laboratories Europe, Oxford Science Park, Edmund Halley Road, Oxford OX4 4GB

Correspondence to:

Prof. P.R. Slater

School of Chemistry, University of Birmingham, Edgbaston, Birmingham, West Midlands B15 2TT

p.r.slater@bham.ac.uk

Abstract

In this paper an investigation into the effect of transition metal ion and selenate/fluorophosphate doping on the structures of $Na_2M(SO_4)_2 \cdot 2H_2O$ (M=transition metal) materials is reported. In agreement with previous reports, the monoclinic (Kröhnkite) structure is adopted for M=Mn, Fe, Co, Cu, while for the smallest first row divalent transition metal ion, M=Ni, the triclinic (Fairfieldite structure) is adopted. On selenate doping there is a changeover in structure from monoclinic to triclinic, with the larger Mn^{2+} system requiring the highest level of selenate to complete the changeover. Thus the results suggest that the relative stability of the two structure types is influenced by the relative size of the transition metal: oxoanion group, with the triclinic structure favoured for small transition metals/large oxoanions.