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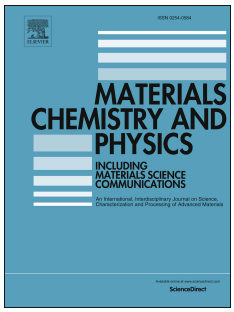

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A reinterpretation of the structural and magnetic properties of $La_{1-x}Na_xSrMn_2O_{5+\delta}$ ($0.1 \leq x \leq 0.3$)

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Abstract

A recent article in this Journal reported the synthesis and characterisation of a new manganite brownmillerite series, $La_{1-x}Na_xSrMn_2O_{5+\delta}$ ($0.1 \leq x \leq 0.3$). On the basis of Rietveld refinements against powder x-ray diffraction data, the authors stated that all synthesised members of the series crystallised in the brownmillerite structure with *Pnma* symmetry. However, the reported synthesis procedure did not include any reaction steps under the strongly reducing conditions normally required to obtain the mixed +2/+3 oxidation state of Mn in the claimed brownmillerites. Furthermore, the presented diffraction data do not contain key indicators of brownmillerite-like structural distortions, but rather, point to oxidised pseudo-cubic perovskite phases with $\delta \geq 0.5$. Here, we present a reinterpretation of the structural data for $La_{1-x}Na_xSrMn_2O_{5+\delta}$ and assess the validity of the previously reported magnetic properties of the series, which were based upon incorrect coordination environments and oxidation states determined for the Mn ions. Some general guidelines for distinguishing between brownmillerite and perovskite phases using x-ray diffraction data are also given.