Crystal Structure of the Layered Compound Sr₃NdFe₃O₉

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This compound belongs to the series Sr₃LnFe₃O₉ (Ln = La – Sm). An original feature of the latter ones is the rapid reaction with ambient moisture to transform into hydrated oxyhydroxide Sr₃LnFe₃O₈(OH)₂ H₂O. [1] Previous electron microscopy and X-ray diffraction studies of Sr₃NdFe₃O₉, [1] revealed an orthorhombic lattice with parameters $a_p\sqrt{2} \times a_p\sqrt{2} \times 28$ Å (a_p : *lattice parameter of the perovskite*). In a first time, the structure was considered as an oxygen deficient n = 3 Rp-Member Sr₃NdFe₃O₉. Powder neutron diffraction experiments at RT and 673 K were then carried out and show that the structure can be described as a stacking of blocks formed by two external slabs of FeO₆ octahedra and a central slab of FeO₄ tetrahedral. To this point of view this structure result of the intergrowth of Brownmillerite type blocks Sr_{3/2}Nd_{1/2}FeO₄ instead of triple perovskite type blocks with adjacent NaCl type layers of SrO.

Powder Neutron diffraction data at Room temperature and susceptibility measurement although shows that this compound although present an antiferromagnetic transition at \sim 500 K

[1] Pelloquin D., Hadermann J., Giot M., Caignaert V., Michel C., Hervieu M. and Raveau B., *Chem. Mater.*, 2004, **16**, 1715.

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