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Structural and Morphological properties of a Novel Double Perovskite Sm2MgRuO6

Double perovskite oxides (A2B′B′′O6) with A-site being Rare Earth, B′ and B′′ the magnetic ions at the six-coordinate B-sites have been studied in the search for materials with enhanced magnetoresistive properties and for spintronics applications. The Sm2MgRuO6 polycrystalline compound was synthesized by conventional high-temperature solid-state reaction under controlled temperature and time conditions. Stoichiometric proportions of high purity (99.99 %) samarium (III) oxide (Sm2O3),ruthenium (IV) oxide, (RuO2) and magnesium oxide (MgO) were mixed thoroughly and heated at 800 ℃ for 12h. The pre-heated powders were sintered again at 1250℃ for 36h with intermediate grinding before any characterization processes could be employed. The Rietveld crystal structure refinement of powder X-Ray diffraction patterns with a full-profile refinement indicated that Sm2MgRuO6 crystallizes in the monoclinic space group P21/n allows for a combination of rock-salt-like ordering of the two B-sites. SEM micrograph shows spherical particles of Sm2MgRuO6, which appear to be agglomerated in some areas. EDS mapping was used to study the uniformity of the element distribution, and it is seen that all the elements are distributed homogeneously. Physical properties measurements, that is, heat capacity (Cp(T) and magnetic properties M(B,T), will also be reported in this presentation.

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