Structural and magnetic properties of La_2CoMnO_6 produced by combustion synthesis

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Multiferroics (MF) are a class of materials which can exhibit both magnetic and electrical order. The coupling between these ordered states can be used in many technological applications such as magnetoeletrics random-access memory and magnetic field sensors. The main problem for the use these materials is the weak magnetoeletric coupling at room temperature, this can be attribute to the antiferromagnetic state present in many materials. The rare-earth manganites doped with Co and Ni are adequate materials to develop applications with these compounds. The preparation conditions are decisive key for the magnetic and electrical properties of these materials. In this context, we present the process of preparation of La_2CoMnO_6 synthesized by the combustion method, structurally characterized by X-ray diffraction complemented by Rietveld analysis and magnetically characterized by SQUID magnetometry. The powders obtained by combustion process were thermally treated between $800^oC-1300^oC$. The samples were submitted to three different heat treatment. The crystalline structure changes according to the heat treatment. The temperature dependence of the magnetization reveal that sample can presents a ferromagnetic order at 225 K or a ferromagnetic order at lower temperatures, bellow 170 K, according to the heat treatment. All samples are exhibits strong irreversibility in ZFC/FC sequences of measurements. And there are strong evidences of a new magnetic order at lower temperatures, which can either be a spin-glass or a weak antiferromagnetic phase.

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