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Structural and magnetic properties of mechanochemically synthesized LaFe_{1-x} Cr_xO_3 (x = 0.5 and 0.75)

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Perovskite oxides with the composition LaFe_{1-x}Cr_xO₃ (x = 0.5 and 0.75) have been studied. The samples have been prepared using the mechanochemical treatment. A mixture of crystalline La(OH)₃, Fe₂O₃ and Cr₂O₃ powders in stoichiometric ratio was mechanochemically treated in a planetary ball mill up to 40 h of milling. The mechanochemical formation of the LaFe_{1-x}Cr_xO₃ perovskite phase was followed by X-ray diffraction and magnetization measurements. The Rietveld refinement of the XRD data shows that the compounds crystallize in an orthorhombic perovskite structure with a random distribution of the Fe and Cr cations at the B sublattice. All structural and microstructural parameters were analyzed. In addition, magnetic measurements for LaFe_{0.5}Cr_{0.5}O₃ show clear antiferromagnetic ordering bellow 250 K, which supports above conclusion of random distribution of Fe and Cr cations.