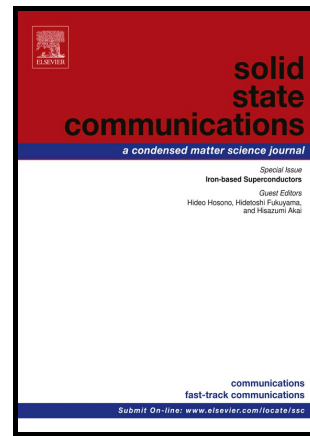


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Structural, vibrational and magnetic properties of the orthoferrites LaFeO₃ and YFeO₃: A comparative study

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ABSTRACT

We performed this work in order to compare several properties of two orthoferrites: LaFeO₃ and YFeO₃. Specifically, we have concentrated on the distortions induced in the bulk material due to the exchange between elements with different atomic radii in the individual A sites of perovskite. We investigate the effect of the distortion in the structural, vibrational and magnetic properties. All samples were prepared by combustion method using citric acid as the combustible. The large difference between the ionic radii of the elements on the A site within the perovskite structure Y (r=1.10 Å) and La (r=1.36 Å) induces remarkable changes in the perovskite structure and in its properties. These changes are more noticeable in the reduction of the lattice parameters and in increase of the octahedral distortion. Changes in the Raman modes and in the magnetic properties also are observed. These studies indicate the existence of spin-phonon coupling in the LaFeO₃ and YFeO₃ structures. The increasing of the distortions on crystalline structure also induces an increase the canting of the spin lattice and consequently an increase of the ferromagnetic component.

Keywords: A. Perovskite; B. Combustion Method; D. Multiferroic; D. Spin-phonon coupling; D. Magnetic properties.

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