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## Structural and magnetic properties of LaCrO<sub>3</sub> half-doped with Al

Romualdo S. Silva Jr.<sup>\*a</sup>, Petrucio Barrozo<sup>a</sup>, N. O. Moreno<sup>a</sup>, J. Albino Aguiar<sup>b</sup>

<sup>a</sup>*Departamento de Física, Universidade Federal de Sergipe, Rod. Marechal Rondon, s/n, 49100-000, São Cristóvão - SE, Brasil*

<sup>b</sup>*Departamento de Física, Universidade Federal de Pernambuco, Aníbal Fernandes, s/n, 50740-560 Recife-PE, Brasil*

\**pbs@ufs.br*

### Abstract

Structural and magnetic properties of LaCrO<sub>3</sub> half-doped with Al are reported in this work. Pure and half-doped samples were prepared by combustion synthesis using urea as fuel. The crystal structure was investigated by X-ray diffraction and Rietveld analysis. A structural phase transition caused by a decrease of the chemical pressure was observed. The scanning electron microscopy (SEM) images show the formation of porous samples with particles of irregular morphologies. A quantitative Energy-dispersive X-ray spectroscopy (EDS) analysis on the surface indicates the inclusion of the Al on the structure. However, a small deficiency of La and Al was observed. Magnetization measurements as a function of temperature reveal an antiferromagnetic order in both samples. A large decrease of T<sub>N</sub> (Néel temperature) and a reduction of the frustration factor is observed in the sample doped with Al. The magnetic isothermal at 5 K shows a typical antiferromagnetic behavior with a slightly spin canting for the doped sample.

Keywords: Combustion synthesis; Structural transition; Rietveld analysis; Perovskite; LaCrO<sub>3</sub>; LaAlO<sub>3</sub>.

### 1. INTRODUCTION

The study of the substitution and doping on the perovskite compound has brought significant advances in the understanding of physical properties and technological application of this material [1]. For example, it's known that the structural, electrical and magnetic properties of these compounds are strongly dependent on the level and type of the doping [2]. Recently, some studies have led to an improvement of multiferroic

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