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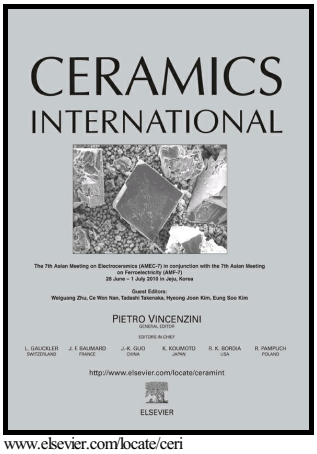


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# Magnetization Study in $LaCr_{1-x}Al_xO_3$ ($0 \leq x \leq 0.95$)

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## Abstract

The structural and magnetic properties of the Al-doped $LaCrO_3$ have been investigated. The samples were produced by combustion method using urea as fuel. X-ray diffraction measurement shows that all samples are formed in a single phase. It is observed that increasing the Al content induces a structural phase transition from orthorhombic to a rhombohedral structure. The magnetic measurements indicate that all samples have an antiferromagnetic order with a strong decrease in the magnetic ordering temperature with increasing Al content. The consistent variation of the magnetic moment confirms that the $Al^{3+}$ ion replaced the $Cr^{3+}$ ion on the B-site of the perovskite.

Keywords: combustion synthesis, antiferromagnetic, $LaCrO_3$, conductor oxide, magnetic dilution.



## INTRODUCTION

Materials with perovskite structure ($ABO_3$) have a large variety of structural, electrical, optical and magnetic properties and have been successfully used in many applications, from the development of catalyst materials to electronic devices with low power consumption. Therefore, the study of the doping in compounds with perovskite structure plays a significant role since it can improve known properties as well as reveal new ones not known to date.

$LaCrO_3$ has an orthorhombic structure at room temperature and presents a structural phase transition to a rhombohedral structure above 540K or when it is submitted to a hydrostatic or chemical pressure [1-4]. This compound exhibits a G-type antiferromagnetic (AFM) order below 290K and has a p-type semiconductor behavior with activation energy $E_a$ = 0.22 eV [5]. When properly doped, $LaCrO_3$ shows a good electrical and ionic conduction and a high bandgap energy. These properties indicate