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# Optical properties of nanocrystalline $\text{La}_2\text{O}_3$ dielectric films deposited by radio frequency magnetron sputtering.

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## Abstract

$\text{La}_2\text{O}_3$  thin films were successfully synthesized by r.f. magnetron sputtering technique. The effect of power, deposition time and substrate temperature on the formation and optical properties of the films was investigated. X-ray diffraction (XRD) studies revealed the formation of hexagonal phased  $\text{La}_2\text{O}_3$  thin films. The influence of sputtering parameters on chemical composition and surface species was studied by X-ray Photoelectron Spectroscopy (XPS). The optical properties were investigated in the wavelength range of 200–1100 nm. The samples were modelled as a three-phase optical model. Optical constants were calculated at 2 eV from classical dispersion model based on the single Lorentz for dielectric materials.

**Keywords:** Optical Properties; Sputtered films; Lanthanum Oxide/hydroxide, Swanepoel method.

## 1. Introduction

Actually, a lot of research efforts is devoted to search for new alternative dielectric materials for complementary metal-oxide-semiconductor (CMOS) devices and materials that increase the optical properties [1-10]. CMOS technology is the basic semiconductor technology for microprocessors, memories and application specific integrated circuits, whereas optical structures are commonly used as non-volatile memory pyro-electric detectors and microwave devices.

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