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Abstract

La_2O_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 La_2O_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.