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Influence of Annealing Temperature on Structural and Electrical Properties of Screen Printed Lanthanum Oxide Thick Films

Sonali Wagh, Umesh Tupe, Anil Patil, Arun Patil

Abstract: (886 Views)

Temperature is one of the key factor that affecting the electrical, physical, structural, and morphological properties as well as the crystallinity of the nanomaterials. The current study investigates the effect of annealing temperature on the structural and electrical properties of lanthanum oxide (La₂O₃) thick films. La₂O₃ thick films were prepared on a glass substrate using a conventional screen printing technique. In this work, T1 is an unannealed prepared film, whereas T2 and T3 are annealed in a muffle furnace for 3 hours at 350°C and 450°C, respectively. XRD technique was exploited to investigate the crystallization behavior of the films. It was found that the crystal structure of La₂O₃ thick films are pure hexagonal phase. The annealing temperatures were revealed to have influence on the crystallite sizes of the films. SEM and EDS was used to study the morphology and elemental analysis of the films respectively. The electrical properties of the films were explored by measuring resistivity, temperature coefficient of resistivity (TCR), and activation energy at lower and higher temperatures regions. The film annealed at 450°C has high resistivity, a high TCR, and small crystallite size. The thickness of the La₂O₃ thick films was also found to decrease as the annealing temperature increased.

Keywords: Lanthanum oxide, annealed, glass substrate, activation energy, structural, electrical properties

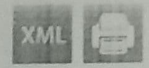
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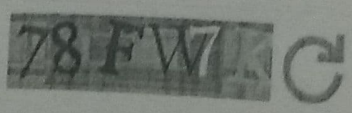
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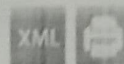
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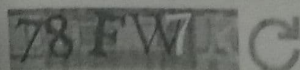
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