

THIN FILMS GROWTH FROM ALUMINA TARGET IRRADIATED BY A KrF LASER

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ABSTRACT. We report on alumina thin films growth from α -Al₂O₃ target by pulsed laser deposition. The alumina plasma was induced by a KrF laser beam at a wavelength of 248 nm and pulse duration of 25 ns. The laser fluence was set to 10 J/cm² and the oxygen pressure was varying from 0.01 to 0.05 mbar. The effects of ambient pressure and substrate temperature on the structure of the Al₂O₃ films are systematically investigated. X-Ray diffraction (XRD) and scanning electron microscopy (SEM) were used for the phase and structural analysis and the morphology of the films respectively. With XRD, the results showed that the films are amorphous when the substrate temperature is less than 550°C. For substrate temperature of 585°C, oriented Al is obtained. Whereas for temperature between 688 °C and 760 °C a γ -Al₂O₃ structure is crystallized under oxygen pressure of 0.01 and 0.02 mbar. However amorphous films are obtained for higher substrate temperature (772°C) where oxygen pressure is greater than 0.05 mbar. The SEM analysis shows a relatively smooth and dense surface.

KEYWORDS: Pulsed laser ablation, Alumina thin films, XRD analysis, α -alumina target.