

Title: KrF pulsed laser deposition of chromium oxide thin films from Cr₈O₂₁ targets

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Abstract: Chromium oxides, Cr_xO_y, are of great interest due to the wide variety of their technological applications. Among them, CrO₂ has been extensively investigated in recent years because it is an attractive compound for use in spintronic heterostructures. However, its synthesis at low temperatures has been a difficult task due to the metastable nature of this oxide. This is indeed essential to ensure interface quality and the ability to coat thermal-sensitive materials such as those envisaged in spintronic devices. Pulsed Laser Deposition (PLD) is a technique that has the potential to meet the requirements stated above. In this work, we describe our efforts to grow chromium oxide thin films by PLD from Cr₈O₂₁ targets, using a KrF excimer laser. The as-deposited films were investigated by X-ray diffraction and Rutherford backscattering spectrometry. Structural and chemical composition studies showed that the films consist of a mixture of amorphous chromium oxides exhibiting different stoichiometries depending on the processing parameters, where nanocrystals of mainly Cr₂O₃ are dispersed. The analyses do not exclude the possibility of co-deposition of Cr₂O₃ and a low fraction of CrO₂.

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