

Title: Influence of growth temperature and carrier flux on the structure and transport properties of highly oriented CrO₂ on Al₂O₃ (0001)

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Source: Chemical Vapor Deposition

Volume: 13 **Issue:** 10

Pages: 537-545 **DOI:** 10.1002/cvde.200706592 **Published:** Oct 2007

Abstract: In this work we report on the structure and magnetic and electrical transport properties of CrO₂ films deposited onto (0001) sapphire by atmospheric pressure (AP)CVD from a CrO₃ precursor. Films are grown within a broad range of deposition temperatures, from 320 to 410 degrees C, and oxygen carrier gas flow rates of 50-500 seem, showing that it is viable to grow highly oriented a-axis CrO₂ films at temperatures as low as 330 degrees C i.e., 60-70 degrees C lower than is reported in published data for the same chemical system. Depending on the experimental conditions, growth kinetic regimes dominated either by surface reaction or by mass-transport mechanisms are identified. The growth of a Cr₂O₃ interfacial layer as an intrinsic feature of the deposition process is studied and discussed. Films synthesized at 330 degrees C keep the same high quality magnetic and transport properties as those deposited at higher temperatures.

Document Type: Article

Language: English

Author Keywords: CrO₂; Ferromagnetism; Spin Polarization; Transport Properties; XRD

KeyWords Plus: Chemical-Vapor-Deposition; Half-Metallic Ferromagnet; Pulsed-Laser Deposition; Oxide Thin-Films; Chromium-Oxide; Epitaxial-Growth; Magnetic-Properties; Spin Polarization; Point-Contact; Magnetoresistance

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Publisher: Wiley-Blackwell

Address Publisher: Commerce Place, 350 Main ST, Malden 02148, MA USA

IDS Number: 226EJ

ISSN: 0948-1907

Citation: Sousa Pedro M, Dias Sonia A, Conde Olinda, **Silvestre Antonio J**, Branford William R, Morris Benjamin, Yates Karen A, Cohen Lesley F. Influence of growth temperature and carrier flux on the structure and transport properties of highly oriented CrO₂ on Al₂O₃ (0001). Chemical Vapor Deposition. 2007: 13 (10), 537-545.