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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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.

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