18-032

PREPARATION AND CHARACTERIZATION OF MOCVD THIN FILM CHROMIUM DIOXIDE COATINGS

Ramanathan, L.V.(1); Pillis, M.F.(1); De Araújo, E.G.(2); Correa, O.V.(1);
(1) IPEN; (2) UFPE;

Chromium dioxide (Cr2O3) films have been widely used to increase the corrosion and wear resistance of metallic substrates. Many techniques have been used to deposit Cr2O3 films on a variety of substrates. This paper presents the preparation of Cr2O3 thin films using a custom made horizontal metal-organic chemical vapor deposition (MOCVD) apparatus at 600 ºC with film growth pressure of 2 mbar. Chromium acetylacetonate was used as the chromium precursor and to select the temperature in nitrogen at which to use this precursor in the MOCVD apparatus, its mass loss as a function of temperature was determined with a thermobalance. The Cr2O3 films were characterized using scanning electron microscopy and x-ray diffraction analysis. The isothermal oxidation behavior of Cr2O3 film coated carbon steel at 600 ºC in air was also determined using a thermogravimetric analyzer. The Cr2O3 thin film increased markedly the oxidation resistance of the steel.