THE EFFECT OF THE SUBSTRATE TEMPERATURE AND THE ACCELERATION POTENTIAL DROP ON THE STRUCTURAL PROPERTIES OF SIC THIN FILMS DEPOSED BY TVA METHOD

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Abstract. *Crystalline Si-C thin films were prepared at substrate temperature between* 200 °C *and* 600 °C *using Thermionic Vacuum Arc (TVA) method. To increase the acceleration potential drop a negative bias voltage up to* -1000 V *was applied on the substrate. The 200 nm thickness carbon thin films was deposed on glass and Si substrate and then* 200-500 nm *thickness Si-C layer on carbon thin films was deposed. Transmission Electron Microscopy (TEM), High Resolution Transmission Electron Microscopy (HRTEM), X-Ray and Photoelectron Spectroscopy (XPS) techniques was performed to characterize the structure of as-prepared SiC coatings. At a constant acceleration potential drop, the crystallinity of the Si-C films deposed on C, increase with increasing of substrate temperature. On the other part, significant increases in the acceleration potential drop at constant substrate temperature lead to a variation of the crystallinity of the SiC coatings XPS analysis was performed using a Quantera SXM equipment, with monochromatic AlKα radiation at* 1486.6 eV.

Keywords: TVA method, Si-C coating, TEM, HRTEM, XPS

1. Introduction

Silicon carbide (SiC) is recognized as an important non-oxide ceramic material, that has some exclusive properties as high hardness, high melting point chemical and thermal stability, oxidation resistance, and suitable electrical and thermal conductivity. On the other hands is considerate as a wide band gap semiconductor. All of these properties determine extensive applications of silicon carbide in

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