

COMPLEX CHARACTERIZATION OF THE BINARY THIN FILMS BASED ON CARBON DEPOSITED BY TVA METHOD

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Abstract. Metal-carbon (C-Me) thin films with compact structure and extremely smooth surface were prepared using the Thermionic Vacuum Arc (TVA) method in one electron gun configuration, on glass and silicon substrates. The deposited films were further investigated to determine their structure formation, in order to assess their properties and applications. The surface morphology and wettability of the obtained multifunctional thin films were investigated using: Transmission Electron Microscopy (TEM), Scanning Electron Microscopy (SEM) and Free Surface Energy (FSE) by See System. The results from TEM measurements show how the Ag, Mg and Si interacted with carbon and the influence this materials have on the thin film structure formation and the grain size distribution. SEM correlated with EDX (Energy dispersive X ray) results reveal a precise comparative study for understanding the complex nanocrystalline structure with varying features depending on the introduced element (Ag, Si, Mg) and the substrate (Si, SiO₂).

Keywords: TVA, Carbides, Nanocrystalline, TEM, SEM, Wettability, Mechanical Properties.

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1. Introduction

Modern technology has placed demands for increasing mechanical and chemical capability in materials used for a variety of technological and commercial applications. Both, the number of applications and mechanical/chemical requisitions have grown with a greater rate than the number of materials that can be used to meet them [1-3]. As a result of recent improvement in technologies to see and manipulate the properties of these materials, the nanomaterials field has seen a

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