

Elaboration et caractérisation de couches minces de TiCN réalisées par pulvérisation magnétron RF

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Soutenue en: 2011

Abstract : Titanium carbonitride is a material of high technological interest because of its beneficial proprieties including high hardness, low friction and chemical inertness. Chemical Vapor Deposition (CVD) processes are used, in a long time, to produce TiCN thin films. But the high substrate temperature condition work causes thermal damage to the deposited films and the substrate. But the physical vapor deposition (PVD) is mostly used because it's an environmentally technique for coating deposition it's used at relatively low substrate temperature. The sputtering is used for depositing TiC_xNy films, the films properties are widely changed by the variation of the sputtering conditions, such as reactive gas pressure, total pressure, and substrate bias voltage. Therefore it was interesting to study the effect of the deposition parameters on deposited films. In this study, titanium carbonitride thin films have been deposited on silicon, glass and steel substrates by reactive RF sputtering (13.56 MHz) from a pure titanium target in Ar-CH₄-N₂ mixture. The main variables investigated are the composition of the CH₄-N₂ gas mixture, the total pressure, the discharge power, substrate bias, and the deposition time. The microstructure and chemical composition of the coating were studied respectively by X-ray diffraction (XRD) and energy dispersive spectroscopy (EDS). The optical and electrical properties will be discussed and correlated to the deposition parameters.

Keywords : TiCN, Thin films, Pulvérisation magnétron RF