

PO2027

Comparative Study of CrSiN films deposited using RF magnetron sputtering with constant and pulsed injection of Nitrogen

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Promising CrSiN films were deposited on XC100 steel, glass and Si substrates by reactive RF magnetron sputtering in an Ar+N₂ mixture using classical method with constant injection and a method with pulsed injection of nitrogen in chamber deposition. The reactive gas pulsing process was used to adjust the chemical composition by monitoring the introduction of chemical compositions and consequently the characteristics of the films. Both Cr and Si targets have 99,99% purity. The microstructure of the resulting films was investigated by XRD to show the effect of different process parameters, such as Si content and gas injection method. Chemical composition and roughness are investigated using SEM EDS/WDS respectively. In addition, XPS examined the bonding structure of the films. Moreover, mechanical and tribological characteristics are illustrated by means of nanoindentation and tribometry.

Keywords

Thin films

CrSiN

Pulsed injection

RF magnetron