Influence of nitrogen content on CrSiN thin film properties deposited by reactive HiPIMS

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Abstract

Although transitional metal nitride films, such as CrN and TiN, have attracted a lot of interests due to the high hardness, high melting point and high chemical stability, their potential applications are limited, especially at high temperature. Recently, many researchers have focused on the development of complex hard film materials such as TiSiN, CrSiN, ZrSiN, nanocomposite films.

It has been proved that the reactive HiPIMS deposition technique enhance the adhesion, the crystallinity and the hardness of the films.

Here, we have have studied the influence of nitrogen content on the CrSiN thin film charactistics and their oxidation behaviour. The CrSiN were deposited using HiPIMS generator (HIP3 Solvix 5K) at floating potential without heating during deposition. The on-time was set at 30 μs and the frequency was 1000Hz. To obtain films with the same thickness, deposition time was adjusted with nitrogen content injected in the gas mixture. CrSiN thin films have been characterized by XRD, SEM and XPS.

Keywords: HiPIMS, reactive sputtering, CrSiN, nanocomposite films

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