

XRD STRUCTURAL ANALYSIS OF EPITAXIAL NiAl THIN FILMS

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Abstract

Epitaxial growth of metals on semiconductors is of significant interest for both fundamental and technological reasons. Recently, nickel-rich NiAl alloys have been employed as model materials for high-temperature shape-memory alloys. Additionally, NiAl films have been extensively used as under-layers for Co longitudinal recording media. In this work, NiAl films were grown on Cu buffer layer deposited on HF etched Si(001) substrates using the sputter deposition method. The structural investigations, using Buerger precession camera and conventional XRD, revealed the growth of epitaxial β -NiAl phase with two twin orientations. Furthermore, grazing incidence diffraction (GID) experiments using bright synchrotron radiation allowed a depth characterization of the different crystalline structures of the $\text{Ni}_{63.2}\text{Al}_{36.8}/\text{Cu}/\text{Si}$ system. It was concluded that the substrate influence on the film crystallinity suppresses the martensitic transformation in such film.

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