Electronic properties of in-situ prepared nanocrystalline $Fe_xNi_{1-x}Ti$ alloy thin films

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In this contribution, we study experimentally the electronic properties of polycrystalline and nanocrystalline $Fe_xNi_{1-x}Ti$ ($0 \leq x \leq 1$) alloy thin films using X-ray photoelectron spectroscopy (XPS). The structure of the samples has been studied by X-ray diffraction (XRD). The $Fe_xNi_{1-x}Ti$ thin films were prepared onto naturally oxidised Si(100) substrates using UHV RF/DC magnetron co-sputtering. The surface chemical composition and the cleanness of all samples were checked in-situ, immediately after deposition, transferring the samples to an UHV analysis chamber equipped with XPS. XRD studies revealed the formation of nanocrystalline $Fe_xNi_{1-x}Ti$ alloy thin films during the deposition process at a substrate temperature of about 293K. In-situ XPS studies showed that the valence bands of nanocrystalline samples are broader compared to those measured for the polycrystalline bulk alloys. Such modifications of the valence bands of the nanocrystalline thin alloy films could influence on their hydrogenation properties [1].

References:

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