



Growth of Electrodeposited Ni-Co Thin Films on Cu Substrate

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Abstract : *This report is on the synthesis of Ni-Co alloy thin films by using electrodeposition methods. The crystalline characteristics have been demonstrated by deposition parameters. The current density, pH, temperature, bath concentration and deposition time have the most influence on the crystallographic structure of the thin film. The X-Ray Diffraction (XRD) measurements confirmed the crystalline behaviour of the thin film samples. The mixed phase of hexagonal close packed structure and face centred cubic structure is obtained at room temperature. For all the face centred cubic peaks, lattice parameters are $a = b = c = 3.56 \text{ \AA}$.*

X-Ray Fluorescence (XRF) gives the percentage of constituent element present in the deposited film on the substrate. The crystallite sizes were also measured by Scherrer equation and it lies in the range of 17.5 nm to 19.97 nm.

Keywords: *Electrodeposition, Binary alloy, Thin film, XRD, XRF, FCC, HCP.*

Introduction :

Electrodeposition is a film growth process that consists in the formation of metallic or semiconducting films on conductive substrates, starting from metal ion precursors in a suitable solvent and occurring via a charge transfer process (Zangari et. al., 2015). Electrodeposition is referred to a situation where the electrons reducing the metal ion come from the electrode substrate via an external power supply. The electrons needed for metal ion reduction can alternatively be provided by the oxidation of reducing compounds present in the solution, this process is generally referred as electroless or autocatalytic deposition. The term electrochemical deposition refers to both the processes described above.

Among the various film growth deposition methods, electrodeposition exhibits several distinctive and unique characteristics; in contrast to physical deposition method. Electrodeposition was made possible by the availability of the first voltage generator, the Volta Pile, and was invented shortly thereafter, in 1805 by Brugnatelli. The first materials to be deposited where Au

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