

NEW METHOD FOR MULTILAYER FILM FABRICATION

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Multilayers are defined as a periodic stacking of individual layers. These films have been shown to exhibit enhanced properties compared to the bulk materials. The combination of submicron metallic alternating layers results in unique magnetic and conductive properties of the materials.

Electrodeposition provides a simple and relatively inexpensive process for producing metallic multilayers. This method entails precise control of the current or potential during deposition. Kinetic and thermodynamic control is an important result. However, there are drawbacks to both single-bath and dual-bath deposition techniques.

We propose a new method of multilayer construction incorporating an alternating flowing stream of electrolytes. The new method employed exist in a closed atmosphere, thus reducing any problems associated with the environment. The flow cell method used will result in sharper interfaces and less chances of oxidation at the surface. X-ray diffraction was used to verify the composition of the film, while scanning electron microscopy and scanning tunneling microscopy were used to examine the purity and sharpness of the interfaces of the multilayers.

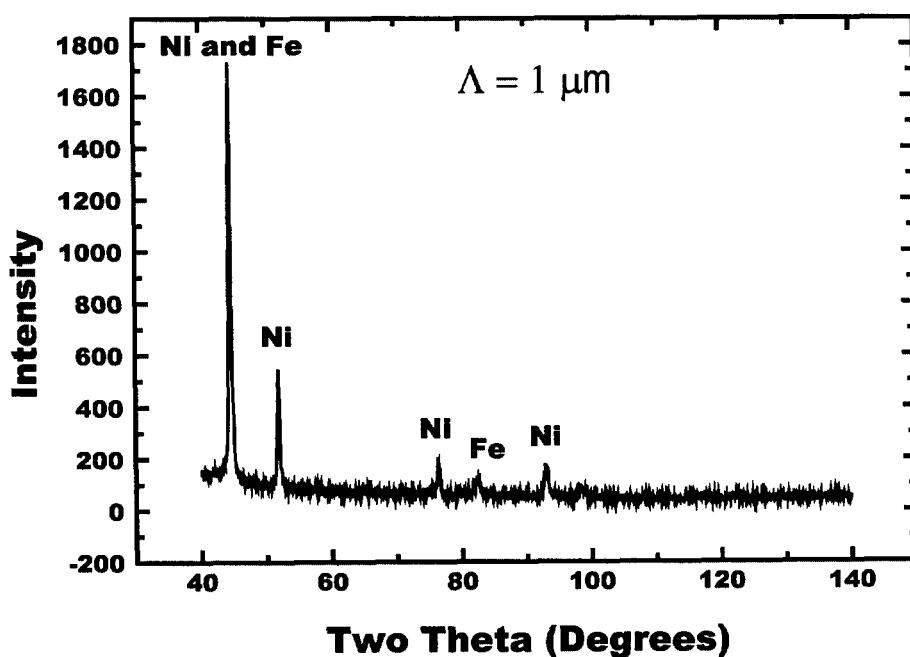


Figure 1. X-ray diffraction pattern of a Ni-Fe multilayer obtained using dual-bath method at ambient conditions.