

# Effect of strong acids on the electrochemical behavior $\text{Ni}_{89}\text{P}_{11}$ glassy alloy

by  
Sanaa Taher Arab

Department of Chemistry, Girls' College of Education , P.O (2321), Jeddah 21451,  
Kingdom Saudi Arabia (dr.[s.arab@hotmail.com](mailto:s.arab@hotmail.com)).

## Abstract

*The effect of the  $\text{H}_2\text{SO}_4$  and  $\text{H}_3\text{PO}_4$  concentration and immersion times on electrochemical amorphous  $\text{Ni}_{89}\text{P}_{11}$  alloy using electrochemical polarization and impedance techniques is carried out at  $30^\circ\text{C}$ . The formation of elemental phosphorus plus NiS or  $\text{P}_2\text{O}_5$  on the alloy surface in  $\text{H}_2\text{SO}_4$  or  $\text{H}_3\text{PO}_4$  solution respectively, are confirmed by XPS method and the formation of Nickel oxides is excluded. In both acids, a passive region is observed, and a gradual increase of the current density continues, indicating that the dissolution of Ni through the passive film is occurring. Nyquist plots exhibited only one capacitive semicircle with an open end in most of applied frequency ranges. The capacitive loop mainly due to the charge transfer resistance of the alloy. The existence of another capacitive loop sometimes confirms the diffusion process on the passive layer.*