

Molybdenum electroplating from aqueous solution on steel substrate and investigation corrosion resistance of the film

Paper Presenter: Mohsen Saremi¹

Mohsen Saremi¹, Negar Sabouhanian², Mahdis Nazarbeygi³

1- School of Metallurgy & Materials Engineering, Faculty of Engineering, University of Tehran, Tehran, Iran.

2- School of Metallurgy & Materials Engineering, Faculty of Engineering, University of Tehran, Tehran, Iran.

3- School of Metallurgy & Materials Engineering, Faculty of Engineering, University of Tehran, Tehran, Iran.

Corresponding Author's E-mail: saremi@ut.ac.ir

Abstract

Molybdenum (Mo) is a rare metal with good properties especially for use in high temperature application. Although a thin film of Mo is useful for many applications but it is not easy to obtain it. The most common method for deposition of Mo is sputtering while electrodeposition can be a better choice because of the lower cost and easier to apply. In the present study an attempt was made to electrodeposit Mo coating on steel by DC electrolysis from an aqueous electrolyte containing molybdate ions. EDAX analysis confirmed the presence of Mo along with some content of oxygen and XRD results showed the presence of molybdenum-oxide phase. The corrosion resistance of coated steel was tested by Tafel polarization and electrochemical impedance spectroscopy (EIS). It was found that the Mo coating although reduced the corrosion of steel but this effect was not significant. This finding is not in accordance to the effect of Mo as an alloying element in SS.316 which reduced the sensitivity to pitting corrosion. It may be due to the point that Mo in presence of other elements like Ni and Cr can show its resistive effect.

Keywords: Molybdenum, Electrodeposition, Aqueous electrolyte, Corrosion resistance

1 -Professor, university of Tehran

2 - Master student of Corrosion and Materials Protection, university of Tehran

3 -Master student of Corrosion and Materials Protection, university of Tehran