Electrodeposition of Mo/MoOx Thin Film on Nickel Substrate

From Dimethyl-Sulfoxide: Assessing Electrolytic Bath

Characteristics

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Non-stoichiometric mixed-valent molybdenum oxide (MoOx) films were deposited on nickel substrates by

electrodeposition from dimethyl-sulfoxide (DMSO) solution. Different experimental electrodeposition

parameters (i.e., supporting electrolyte concentration and small amounts of water on the electrolytic bath)

have been assessed in order to analyze their influence on the mechanism of induced Mo/MoOx deposition.

Cyclic voltammetry was used to assess the electrochemistry of the process while morphological changes of

the deposited films were monitored by scanning electron microscopy (SEM). SEM images of the molybdenum

oxide film show that the characteristic snowed structure on the film surface become more prevalent during the

transition from the oxidized state to the reduced state without signification change in the Root Mean Square

(RMS) surface roughness value. Furthermore, energy dispersive (X-ray) spectroscopy (EDS) studies show

that the presence of water in the electrolytic bath has great effect on the morphology of the films.