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## Electrodeposition and characterization of metallic molybdenum from aqueous electrolytes containing high acetate concentrations

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### ABSTRACT

Metallic molybdenum coating was deposited from an aqueous electrolyte containing a high concentration of acetate and molybdate ions in pH of  $6.8 \pm 0.2$ . It is complicated to deposit molybdenum from an aqueous electrolyte because of its high reactivity with oxygen. The mole ratios of water to acetate were in the range of  $(2.4 \pm 0.2):1$ . It was found that the change in bath stirring rate can result in the deposition of molybdenum oxide instead of Mo coating. Also the morphological differences of metallic Mo and molybdenum oxide layer were investigated. In the present study, a successful attempt was made metallic Mo coating with a thickness of 3-7  $\mu\text{m}$  that was dependent on the DC current density.

The XRD investigation indicated that the crystal structure of Mo coating was amorphous. The surface composition of deposits was ascertained by energy dispersive X-ray microanalysis (EDS) that showed the presence of high Mo content (90.7%) and low content of oxygen (9.3%). In addition, different EDS analysis was obtained from the top surface of coating and subsurface section. The surface morphology of coating was studied by scanning electron microscopy (SEM). Also, XPS analysis confirmed deposition of Mo (0) metal.

**Keywords:** Metallic Mo coating, Electrodeposition, Morphology, EDS analyses, XPS

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