Electrodeposition and Characterization of Co-W Alloy from Regenerated Tungsten Salt

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In this study, Co-W alloy was electrodeposited by regenerated sodium tungstate, cobalt sulfate and citric acid as complexing agent. Microhardness testing, XRF, XRD and SEM were used to characterize the properties of the alloy coatings. The optimal conditions for the electrodeposition were found as follows: sodium tungstate concentration 0.3mol/L, cobalt sulfate concentration 0.2mol/L, a current density of 500mA/dm², temperature of 60 °C and pH 5-7. Under the optimal conditions, the obtained alloy coating exhibits hardness of 550HV with smooth and compact morphology and deposition current efficiency of 65%. The prepared Co-W alloy using regenerated agent presents similar hardness compared to the alloy obtained from analytical grade materials by this complex electrodeposition process, indicating that the regenerated tungsten can be used to prepare qualified Co-W alloy coating.

Keywords: Electrodeposition; Co-W alloy; Complexation; Regenerated tungsten

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