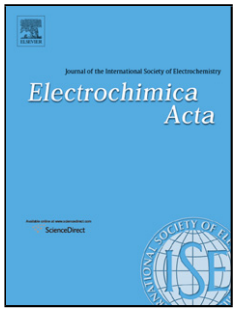

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Structural, magnetic, and mechanical properties of electrodeposited cobalt-tungsten alloys: intrinsic and extrinsic interdependencies

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Abstract

The mapping of structural, magnetic, and mechanical properties of Co-W coatings galvanostatically electrodeposited from a citrate-borate bath is investigated. The intrinsic characteristics of the coatings, such as crystallite size or tungsten content are correlated with the extrinsic growth parameters, such as pH, complexes distribution, and current density. The increase in pH from 5 to 8 results in an increase of the W content in the deposits from 2 at.% up to 36 at.% in a controlled way, and it correlates with an increase in concentration of W(VI) complexes in the bath. The crystallite size estimated from XRD patterns, decreases from 39 to 5 nm with increasing W

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