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Abstract:

Electrodeposition of trivalent chromium on mild steel substrate is a promising alternative to traditional hexavalent chromium plating baths due to its non-toxicity and environmental friendliness. Electrodeposition of trivalent Chromium is more challenging than hexavalent Chromium due to the lower reduction potential of trivalent chromium ions. In this research, we studied the current efficiency and microhardness on Cr deposited mild steel substrate. We observed that the current efficiency and microhardness 3.2% and HRC 3595 respectively when we used 80g/L Cr₂(SO4)₃ in the bath solution. We studied surface morphology by scanning electron microscopy (SEM) and energy-dispersive X-ray spectroscopy (EDX). The SEM results exhibit smooth and bright surface morphology with almost uniform atomic distribution having some clusters on the surface. The EDX result confirmed the presence of deposited Cr on the mild steel substrate.

