

The Effects of NaF Concentration on the Zinc Coating Electroplated in Supercritical CO₂ Mixed Zinc Chloride Bath

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Abstract : This research studies the electroplating of zinc coating in the zinc chloride bath mixed with supercritical CO₂. The sodium fluoride (NaF) was used as the bath additive to change the structure and property of the coating, and therefore the roughness and corrosion resistance of the zinc coating was investigated. The surface characterization was performed using optical microscope (OM), X-ray diffractometer (XRD), and α -step profilometer. Moreover, the potentiodynamic polarization measurement in 3% NaCl solution was employed in the corrosion resistance evaluation. Because of the emulsification of the electrolyte mixed in Sc-CO₂, the electroplated zinc produced the coating with smoother surface, smaller grain, better throwing power and higher corrosion resistance. The main role played by the NaF was to reduce the coating's roughness and grain size. In other words, the CO₂ mixed with the electrolyte under the supercritical condition performed the similar function as brighter and leveler in zinc electroplating to enhance the throwing power and corrosion resistance of the coating.

Keywords : supercritical CO₂, zinc-electroplating, sodium fluoride, electroplating

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