

Corrosion Evaluation of Zinc Coating Prepared by Two Types of Electric Currents

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Abstract : In this research, zinc coatings were fabricated by electroplating process in a sulfate solution under direct and pulse current conditions. In direct and pulse current conditions, effect of maximum current was investigated on the coating properties. Also a comparison was made between the obtained coatings under direct and pulse current. Morphology of the coatings was investigated by scanning electron microscopy (SEM). Corrosion behavior of the coatings was investigated by potentiodynamic polarization test. In pulse current conditions, the effect of pulse frequency and duty cycle was also studied. The effect of these conditions and parameters were also investigated on morphology and corrosion behavior. All of DC plated coatings are showing a distinct passivation area in -1 to -0.4 V range. Pulsed current coatings possessed a higher corrosion resistance. The results showed that current density is the most important factor regarding the fabrication process. Furthermore, a rise in duty cycle deteriorated corrosion resistance of coatings. Pulsed plated coatings performed almost 10 times better than DC plated coatings.

Keywords : corrosion, duty cycle, pulsed current, zinc

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