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Finite Element Modelling of Electrokinetic Deposition of Zinc on Mild Steel with ZnO-Citrus sinensis as Nano-Additive

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Abstract

The electrokinetic deposition of zinc on mild steel substrate under the influence of ZnO-Citrus sinensis nano-additive was investigated numerically using a Finite Element (FE) solver. The conductivity of the Acid chloride plus ZnO-Citrus sinensis nano-additive electrolyte and the properties of Zinc and mild steel electrodes were used as the input codes for the model. The model was designed on a 3-dimensional scale. The boundary conditions were set and the model was meshed using the finer mesh capability in the FE solver. The model was processed and readings of the modelled zinc deposited mild steel were taken, validated and analysed so as to get the optimum parameters from the deposition process. Based on the results, the deposition mass and thickness increased with deposition time with ZnO-Citrus sinensis nano-additive, it is thus recommended that relatively high deposition time should be used in order to achieve optimum deposition.

Keywords

Nano-additive Nanotechnology Corrosion protection Electrodeposition Mild steel Finite element CFD

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