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The effect of the surface morphologies on the corrosion resistance of insitu growth MgAl-LDH based conversion film on AA6082

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Abstract

In this work, we report the controlled synthesis of MgAl layered double hydroxide (LDH), endowed with well defined distinct morphologies, developed by the in-situ growth method on the AA6082. The utilization of various morphologies such as flower shape, stone shape, cauliflower-like, and platelet shapes, synthesized at various reaction temperature and initial salt concentrations regimes, is discussed in related to their corrosion resistance performance. The morphological and structural properties of the as-prepared synthetic coatings were studied by scanning electron microscopy (SEM), energy dispersion spectroscopy (EDS), X-ray diffraction (XRD), while the corrosion resistance of the coating was analyzed through potentiodynamic polarization studies and electrochemical impedance spectrum. The variety in the morphology and structure of MgAl LDH play a significant role in determining the corrosion resistance behavior. These findings can contribute to the precise structural and morphological understandings of MgAl-LDH as corrosive resistance film. This work highlights the importance of the various MgAl LDH morphologies on their corrosion resistance behavior.

Keywords: MgAl LDH thin film, morphologies, AA6082.

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