Improved Adhesion and Corrosion Resistance of an epoxy/Zn-5Al Composite Coating via NaF in a Phosphate Solution

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The effect of NaF concentration on the formation of a phosphate film on a hot-dipped Zn-5Al coating, and consequently, the adhesion of the epoxy/Zn-5Al composite coating, has been investigated in this paper. The results showed that the morphology of the phosphate film and the adhesion, as measured by the tape test according to ASTM D3359, strongly depend on the concentration of the fluoride ions derived from NaF in the phosphate solution. Adhesion failure of an electrostatically sprayed epoxy on a bare hot-dipped Zn-5Al coating can be prevented with the optimal concentration of NaF (0.4 g/L) in a phosphate solution used in this study. At the same time, phosphating improved the corrosion resistance of the Zn-5Al coating in a NaCl solution.

Keywords: Fluoride; Phosphating; Adhesion; Epoxy /Zn-5Al duplex coating

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