

Abstract

Characterization of Zinc Phosphate Coatings: Influence of pH and Temperature on Morphology and Corrosion Resistance[†]

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Abstract: Zinc phosphate coatings are commonly used to protect high-strength steel rods and improve the corrosion protection ability. The temperature and the pH of the phosphating bath are important parameters that affect to the film's appearance, porosity, and composition. In this work, some variations in the phosphating solution have been analysed. In particular, the temperatures were modified in the range of 50–75 °C and the pH values were fixed at 2.4, 2.8 and 3. Phosphate coatings were investigated via scanning electron microscopy (SEM) and energy dispersive X-ray (EDX), which allow a complete surface analysis, including of both the morphology and the composition. The coating's mass was also determined by the gravimetric method. For the corrosion resistance of the film, the linear polarization curves obtained in Na₂SO₄ 0.1 M were analyzed. The results show that the phosphating baths at 60–65 °C and pH at 2.44 produce a thicker film, with the highest amount of Zn and improved corrosion resistance.

Keywords: phosphate; corrosion; SEM



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