

The influence of deposition temperature on the morphology and corrosion resistance of zinc phosphate coating on mild steel

Abstract

The influence of phosphating temperature on the surface morphology and corrosion resistance of zinc phosphate coatings on mild steel was investigated. The phosphate layers were deposited on steel from phosphating bath at different temperatures (45 ~ 75 °C). The surface morphology and composition of phosphate coatings were investigated via scanning electron microscopy (SEM), and energy-dispersive X-ray (EDX). The corrosion resistance of the coatings was evaluated by polarization curves (anodic and cathodic) in an aerated 3.5% NaCl solution. The results showed that the increase in temperature of the phosphating bath up to 55 °C caused an increase in surface coverage and in turn resulted in better corrosion resistance. At high temperature (65 °C and 75 °C) the deposition coverage decreased indicating that the best coverage for the phosphate layer on the metal surface was achieved at 55 °C.