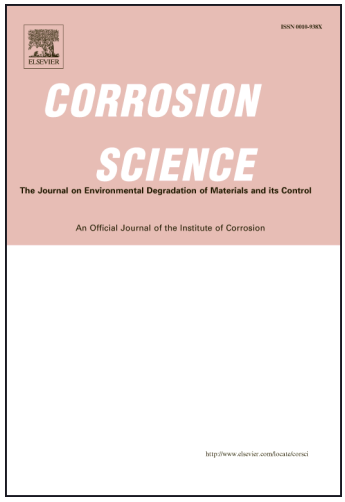

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Influence of the alloying component on the corrosion behaviour of zinc in neutral aerated sodium chloride solution

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Abstract

The effect of Zr alloying addition on the corrosion resistance of Zn has been investigated. In this work, the corrosion behaviour of Zn-1Zr (mass%) alloys has been assessed by open circuit potential and electrochemical impedance spectroscopy (EIS) measurements carried out in a 0.1 M NaCl solution, at approximately neutral pH, without stirring and in contact with the air. For comparison, the electrochemical tests have also been performed on unalloyed Zn as well as on Zn-1Ti commercial alloy employed as a protective coating for steel. Both open circuit potential and EIS results indicate that Zn-1Zr alloy exhibits superior corrosion resistance as compared to unalloyed Zn and Zn-1Ti alloy. This improvement may be ascribed to the formation of a corrosion products layer, mainly composed of $Zn_5(OH)_8Cl_2 \cdot H_2O$ and ZrO_2, which shows higher protective effectiveness than the ones formed on Zn-1Ti alloy or on unalloyed Zn.