

Electrochemical corrosion behaviour of Mg-(Ca,Mn) sacrificial anodes

Abstract

The aim of the study is to identify the effect of Ca in Mg-Mn alloy on electrochemical corrosion behavior for the development of high performance sacrificial anode. Mg alloys were fabricated by casting technique under an inert atmosphere. 0.35 ~ 1.11 wt.% of Ca were added as alloying element. The finding shows that the addition of small Ca in Mg-Mn anodes was found not significantly affecting the corrosion rate. However, small content of Ca was as much as necessary improving electronegativity of open circuit potential and modifying anodic polarization in promoting the instabilities of surface passive layer hence results in the further dissolution process between ion and alloy species underneath. No passivation occurs on the standard samples. Pitting profile only occur on Mg-Mn anode that has lower Ca content (0.35 wt. %). An XRD result shows no present of Mg_2Ca phase on the as-cast anode containing 1.11 wt. % Ca. As a conclusion, the influence of small content of Ca was profoundly modifying electrochemically behaviour of Mg containing Mn anodes except corrosion rate.

Keywords — Corrosion, electrochemistry, magnesium