

Relationship between the corrosion behavior and the thermal characteristics and microstructure of Mg-0.5Ca-Xzn alloys

Abstract :

Effects of secondary phases on corrosion behaviour of the Mg-0.5Ca-xZn alloys were investigated by polarization, immersion and hydrogen evolution tests. The Mg 2Ca phase nucleated at 520°C while, Ca 2Mg 6Zn 3 and Mg 51Zn 20 phases were formed at 420°C and 330°C respectively. The corrosion resistance of Mg-0.5Ca alloy was enhanced with the addition of Zn up to 1%, while further addition reversed the effect. The Mg-0.5Ca-1Zn alloys with (α -Mg+Ca 2Mg 6Zn 3+Mg 2Ca) phase showed lower corrosion rate than the alloys with (α -Mg+Ca 2Mg 6Zn 3) and (α -Mg+Ca 2Mg 6Zn 3+Mg 51Ca 20) phases. The amount of corrosion product, composed of Mg(OH) 2 and hydroxyapatite on the surface of the alloy, increased with increasing Zn content.