Corrosion and Discharge Performance of Mg-2Zn-0.5Ce-0.5Mn-0.2Ca Alloy in NaCl Solution

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In this study, Mg-2Zn-0.5Ce-0.5Mn-0.2Ca alloy was prepared. The corrosion and discharge properties of the alloy in 3.5 wt.% NaCl solution was studied and compared with those of an AZ31 alloy. The Mg-2Zn-0.5Ce-0.5Mn-0.2Ca alloy exhibits higher corrosion resistance than that of the AZ31 alloy. The corrosion current densities of the Mg-2Zn-0.5Ce-0.5Mn-0.2Ca and AZ31 alloys are 0.31 mA cm² and 0.54 mA cm², respectively. The Mg-2Zn-0.5Ce-0.5Mn-0.2Ca alloy also exhibits better discharging performance, such as a higher discharge voltage and anodic efficiency, than that of the AZ31 alloy. The average discharge potentials of the Mg-2Zn-0.5Ce-0.5Mn-0.2Ca and AZ31 anodes are -1.45 V and -1.31 V mA cm², respectively. The anodic efficiencies of the Mg-2Zn-0.5Ce-0.5Mn-0.2Ca and AZ31 anodes are 62.1% and 53.8%, respectively. Thus, the Mg-2Zn-0.5Ce-0.5Mn-0.2Ca alloy is a good candidate as an anode material for Mg batteries.

Keywords: Mg-2Zn-0.5Ce-0.5Mn-0.2Ca alloy; Corrosion resistance; Discharge potential; Anodic efficiency

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