CMDWC 2021

# Effect of indium chloride on corrosion of Mg under polarization

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Magnesium is a light weight, relatively low cost and Earth abundant material. The advantageous properties of Mg increase its usage in different areas, including batteries. Aqueous Mg-air primary batteries represent one class of promising power sources for multiple applications. However, during the discharge Mg anode is prone to self-corrosion with formation of an insoluble film of magnesium hydroxide and generation of hydrogen. The possible solution for enhancement of battery performance is addressing the Mg electrode-electrolyte interface by appropriate additives, that serve as corrosion inhibitors for the suppression of the Mg self-corrosion and that prevent the formation of blocking precipitates, Mg(OH)2. In this work, we studied the effect of InCl3 as effective additive, which at low concentrations reduce the self-corrosion of Mg electrode [1]. The performance of InCl3 was investigated by EIS measurement and in-situ local simultaneous measurement of pH with concentration of dissolved oxygen. InCl3 was capable of retarding electrolyte alkalization during polarization due to its hydrolysis reaction, which leads to less film-relevant potential drop. Nevertheless, insufficient amount of In3+ addition also shows pH buffering effect for the bulk environment, but is not able to hinder the increase of local pH.

[1] L. Wang, D. Snihirova, M. Deng, C. Wang, D. Höche, S.V. Lamaka, M.L. Zheludkevich, Indium chloride as an electrolyte additive for primary aqueous Mg batteries, Electrochim Acta, (2021) 137916.