Metal oxides as additive to suppress dendrite formation on Zn anode of rechargeable aqueous battery

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Recently rechargeable aqueous zinc-ion batteries have attend interest due to of their low cost and high safety advantages; but they still suffer from the problem of dendrite growth on Zn metal anodes than cause early battery destruction [1]. There are various methods for modification of surface of Zn metal anodes to suppress dendrite formation [2].Suppression of roughness or dendrite evolution by electroplating may also be achieved with ppm-levels of additives in the plating electrolyte. Several studies reporting the use of additives to control the Zn deposit quality and appearance are noted. Additives in these studies include polyvinyl alcohols, polyamines, carbonyl compounds and surfactants [3].

The role of metal oxides, namely germanium oxide, vanadium oxide, indium oxide and scandium oxide (100 ppm) have been investigated in the electroplating process on the surface of metallic zinc foil disks. The mix of 0.6M $ZnCl_2$ and 0.1M NH_4Cl in DI water worked as a plating solution. Synthesized Zn-metal oxide anodes characterized by X-ray diffraction and Scanning electron microscopy before and after cycling to study surface morphology, structural changes of anode and to evaluate dendrite growth.

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