

Electrodeposition of Zinc from Binary ZnCl_2 - DMSO_2 Molten Electrolyte at Room Temperature

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The electrochemical behaviour of zinc on copper, platinum, and tungsten working electrodes was investigated in a binary ZnCl_2 - DMSO_2 room temperature molten salt electrolyte in the temperature range of 60–80 °C. Various over-potentials, –0.1, –0.2, –0.3, –0.4, and –0.5 V, were chosen as deposition potentials. The nucleation/growth of zinc changed from progressive to instantaneous if the over-potentials increased from low to high level. The surface morphology and crystal structure of the deposited layer were investigated using scanning electron microscopy (SEM) and X-ray diffraction (XRD). Moreover, larger grain size and hexagonal close packing of the zinc layer at –0.5 V were observed by transmission electron microscopy (TEM) with electron diffraction mapping.

Key words: Room Temperature Molten Salt; ZnCl_2 - DMSO_2 Electrolyte; Progressive Nucleation; Instantaneous Nucleation.