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BOOK OF ABSTRACTS

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ALUMINIUM DEPOSITS FROM AlCl_3 +UREA SOLVATE IONIC LIQUID ON ALUMINIUM SUBSTRATE AT ROOM TEMPERATURES

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Abstract. Development of low temperature processes for electrochemical deposition of aluminium is highly desirable in order to overcome high energy cost, toxic emission of fluoride and chloride from high temperature molten salt electrolytes. AlCl_3 +urea ionic mixture known as deep eutectic solvent (DES) is recognized as an economical electrolyte for aluminium electrodeposition at room temperatures [1, 2]. Electrodeposition experiments were conducted on aluminum electrode using constant deposition current density (2 mA cm^{-2}) at different bath temperatures: 25 °C, 35°C and 50°C. Using SEM and EDS techniques the deposits were studied for their morphology dependence on the experimental conditions, particularly working temperature. Electrochemical techniques used were linear sweep voltammetry and chronopotentiometry. The size of individual Al grains deposited under the same constant current density became larger (from nanometers to micrometers) with increasing bath temperature. The shape of deposits ranged from regular crystal grains to complicated morphology including needle-like and flake-like structures.

Keywords: electrochemical deposition; aluminium; deep eutectic solvent.

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References

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