

Magnetic Films of Cobalt/Aluminum Electrodeposited from the Room Temperature Molten Salts AlCl_3 -BPC- CoCl_2

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Z. Naturforsch. **59b**, 519 – 524 (2004); received October 30, 2003

The electric conductivities of molten mixtures of aluminum chloride-butylpyridinium chloride-cobalt chloride (AlCl_3 -BPC- CoCl_2) were measured using a computerized direct-current method. The conductivities of all the melts increased with increasing temperature. The electrodeposition of Co/Al films from the AlCl_3 -BPC melt containing a small amount of CoCl_2 has been studied by cyclic voltammetry. Compact and smooth Co/Al thin films could be obtained at a deposition potential of -0.4 V. The surface morphology and the composition of the electrodeposited thin films were studied using scanning electron microscopy (SEM) and atomic force microscopy (AFM). The magnetic properties of the deposited thin films have been investigated via magnetic force microscopy (MFM) and vibrating sample magnetometry (VSM). Higher magnetization and smooth domains of Co/Al layers could be obtained at the deposition potentials of -0.1 V and -0.4 V, respectively.

Key words: Magnetic Film, Room Temperature Molten Salt, Electric Conductivity, Cyclic Voltammetry, Surface Morphology