Conductivity and Electrochemistry of Cobalt(Ⅱ) and Dysprosium Chloride in Zinc Chloride -1-Ethyl-3-methylimidazolium Chloride Room Temperature Molten Salt

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Abstract

For the needs of optical data storage, reading and writing, the preparation of magneto-optical thin film materials has been the major study all the world. In recent years, the effects of rare earth element in magneto-optical thin film materials have been a considerable project, owing to the rare earth element improved the magneto-optical Kerr effect and high coercivity of magneto-optical thin film in the shorter light wave length range. So, the transition metal-rare earth alloy is the important one of research of magneto-optical thin film materials.

In this present study, the zinc chloride with 1-ethyl-3-methylimidazolium chloride (EMIC) used to form room temperature melt , because the high reaction of $AlCl_3$ with water results in the impurities easily. Moreover, the electric conductivity of melt is the important one of transport characteristics. However, the electric conductivity of the system had not reported. In view of the theory research of melt application, conductivity measurements appeared to be needed urgently.

The electrochemistry of cobalt(Ⅱ) and dysprosium chloride in acidic $ZnCl_2$-EMIC melts at 80 ℃ has been investigated by cyclic voltammetry. To our best knowledge, no detailed electrochemistry of Co(Ⅱ) and Dy(Ⅲ) in these mlet systems have been reported before, the results of analysis will be the base of electrodeposition of Co-Dy alloys from the room temperature molten salts.

Key words: Conductivity, Electrochemistry, Transition metal-rare earth alloy, Zinc chloride, 1-ethyl-3-methylimidazolium chloride, Room temperature molten salt.