

Fused Salt Electrolysis of Rare-Earth Materials from the Domestic Ore and Preparation of Rare-Earth Hydrogen Storage Alloys

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Abstract : Fused salt electrolysis was studied to make the high purity rare-earth metals using domestic rare-earth ore. The target metals of the fused salt electrolysis were Mm (Misch metal), La, Ce, Nd, etc. Fused salt electrolysis was performed with the supporting salt such as chloride and fluoride at the various temperatures and ampere. The metals made by fused salt electrolysis were analyzed to identify the phase and composition using the methods of XRD and ICP. As a result, the acquired rare-earth metals were the high purity ones which had more than 99% purity. Also, VIM (vacuum induction melting) was studied to make the kg level rare-earth alloy for the use of secondary battery and hydrogen storage. In order to indentify the physicochemical properties such as phase, impurity gas, alloy composition and hydrogen storage, the alloys were investigated. The battery characteristics were also analyzed through the various tests in the real production line of a battery company.

Keywords : domestic rare-earth ore, fused salt electrolysis, rare-earth materials, hydrogen storage alloy, secondary battery

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