



논문개요집

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논문개요집



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The Korean Magnetics Society

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Barbuda1

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Study on cathode materials using Mössbauer spectroscopy

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Various energy storage technologies have been commercialized and used domestically, and technology development is actively underway. The fastest-growing lithium-ion battery in the Energy Storage System is lightweight, has no memory effect, and easily maintains its charge capacity. It is widely used in portable electronic devices and electric vehicles because it can save energy without loss for a long time because of a low natural discharge. A lithium-ion battery is composed of a cathode material, an anode material, an electrolyte, and a separator. Lithium ions, which exist in an ionic state, generate electricity by moving from the cathode to the anode during charging and from the anode to the cathode during discharging. These cathode materials are a reactant participating in an actual electrochemical reaction, and they are required to have an energy density, an output characteristic, increased lifetime characteristics, and improved stability. Therefore, the lithium-ion activation capability of the cathode material determines the performance of the battery. In this presentation, the magnetic properties of iron-based cathode materials were analyzed using X-ray diffraction and Mössbauer spectroscopy. The Mössbauer spectroscopy allowed us to determine the valence states of iron in the crystal structures of cathode and also to unveil the presence of different iron-containing phases. In addition, we present the changes in the structure and iron oxidation state accompanied with lithium extraction and insertion in cathode materials, and study magnetic hyperfine interaction with temperature.