

第129回フロンティア材料研究所講演会

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演題: New materials research and functional development of perovskite-related osmium oxides

In this talk, I will introduce recent activities of research of osmium oxides, which have been synthesized by a high-pressure and high-temperature method. The topic includes the double perovskite oxide $\text{Sr}_2\text{CrOsO}_6$ with a $3d^3-5d^3$ configuration, which has been known to exhibit very high- T_C ferrimagnetism (~ 725 K) at the endpoint of half-metallicity. Many substitution studies have been conducted theoretically and experimentally over the last two decades to shed more light on the open issue of how the $3d^3-5d^3$ configuration generates the high- T_C ferrimagnetic state and to accelerate development toward applications. In our study, we have succeeded in synthesizing a novel solid solution of $\text{Sr}_2\text{Cr}_{1-x}\text{Ni}_x\text{OsO}_6$ under high-pressure and high-temperature conditions. $\text{Sr}_2\text{Cr}_{0.5}\text{Ni}_{0.5}\text{OsO}_6$ exhibits magnetization six-fold greater (~ 1.2 $\mu\text{B}/\text{formula unit}$ at 5 K) than that of $\text{Sr}_2\text{CrOsO}_6$. This enhancement is preserved even at room temperature. Other topics may also be introduced briefly.

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