

Electrical and magnetic property of new filled skutterudite $\text{LnOs}_4\text{P}_{12}$ (Ln=Eu,Gd,Tb,Dy,Ho and Y)

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New filled skutterudites $\text{LnOs}_4\text{P}_{12}$ (Ln=Eu,Gd,Tb,Dy,Ho and Y) have been prepared at high temperatures and high pressure. X-ray diffraction of these compounds is studied at room temperature. The relationship between lattice constants and atomic numbers of lanthanide (including Y) is obtained for $\text{LnOs}_4\text{P}_{12}$ (Ln=lanthanide). Electrical and magnetic properties of the new filled skutterudites with heavier lanthanide is investigated at low temperatures. $\text{EuOs}_4\text{P}_{12}$ and $\text{GdOs}_4\text{P}_{12}$ show ferrromagnetic transitions at around 15K and 22K, respectively. The valence of ion Eu and Gd is +2 and +3, respectively. $\text{DyOs}_4\text{P}_{12}$ does not show the magnetic transition down to 2K. However, a small electrical anomaly is found at 5K. $\text{YOs}_4\text{P}_{12}$ exhibits a superconducting transition at around 3K. This compound is a new superconductor. Electrical and magnetic anomalies of new filled skuterudites with heavier lanthanide $\text{LnOs}_4\text{P}_{12}$ (Ln=Eu,Gd,Tb,Dy,Ho and Y) are discussed.

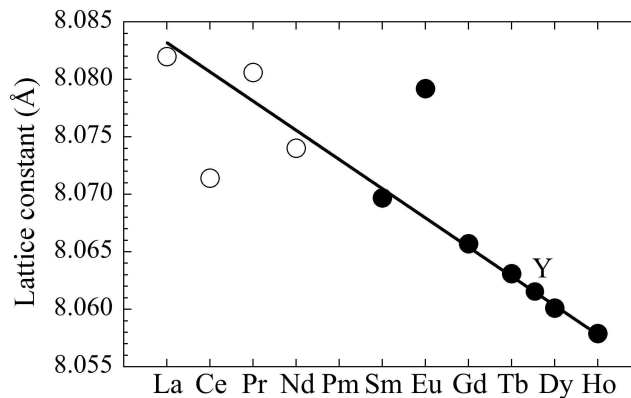


Figure 1: Relationship between lattice constant and atomic numbers of lanthanide.