

Abstract Submitted
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Verwey-type transition in $\text{Pb}_3\text{Rh}_{7-x}\text{Mn}_x\text{O}_{15}$ Solid Solution¹

ALVIN GATIMU, HIROSHI MIZOGUCHI, ARTHUR SLEIGHT, MAS SUBRAMANIAN, OREGON STATE UNIVERSITY MATERIALS INSTITUTE AND DEPARTMENT OF CHEMISTRY TEAM — Mixed-valence compound $\text{Pb}_3\text{Rh}_7\text{O}_{15}$ shows an isotropic room temperature resistivity ($\sim 1 \times 10^{-3}$ ohm cm) that slowly increases with decreasing temperature until 185K where the resistivity increases more rapidly as temperature is further decreased. Magnetic susceptibility and thermopower measurements on $\text{Pb}_3\text{Rh}_7\text{O}_{15}$ also show a discontinuity at about 185 K. Structural analyses of X-ray diffraction data obtained above and below 185 K indicate that a change in space group has occurred at 185 K and it is likely that this transition at 185 K is related to a charge ordering. $\text{Pb}_3\text{Mn}_7\text{O}_{15}$ also crystallizes in a similar hexagonal structure. A complete solid solution of $\text{Pb}_3\text{Rh}_{7-x}\text{Mn}_x\text{O}_{15}$ has been prepared and crystals with varying Mn content have been grown in a PbO flux. The phase transition at 185 K fades away as the Mn substitutes for Rh. Structural, electrical and magnetic studies are discussed.

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