

Low temperature electrical conduction in amorphous alloys $\text{Si}_{1-y}\text{Ni}_y\text{:H}$

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Abstract:

Variable range hopping (VRH) conduction mechanism ($\rho = \rho_0 \cdot \exp(T_0/T)^p$) is observed in hydrogenated amorphous silicon-nickel alloys $\text{Si}_{1-y}\text{Ni}_y\text{:H}$. In three samples ($y=0.07$; 0.08 and 0.15), we studied the influence of temperature on electrical conductivity. As the temperature decreases, a crossover from Mott to Efros-Shklovskii VRH was observed and studied in the alloys $\text{Si}_{0.85}\text{Ni}_{0.15}\text{:H}$. The hopping depends on the fraction of the metal.