

Correlation of charge density wave with superconductivity in $\text{LaPt}_2(\text{Si}_{1-x}\text{Ge}_x)_2$

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Interplay between various electronic orders is always a subject of contemporary research in condensed matter physics. Here we investigated the Interplay between charge density wave (CDW) and superconductivity (SC) in $\text{LaPt}_2(\text{Si}_{1-x}\text{Ge}_x)_2$ through electrical transport and magnetic measurements. LaPt_2Si_2 crystallizes in CaBe_2Ge_2 type structure and it shows a first order structural phase transition from tetragonal to orthorhombic structure accompanied by charge density wave (CDW) transition at 112 K and superconducting transition at around 1.22 K as confirmed by temperature dependence of resistivity and magnetic measurements. For 2% doping of Germanium, while the charge density wave temperature T_{CDW} decreases superconducting transition temperature T_c shows an increase. T_{CDW} increases for 5% doping of Germanium and superconducting transition decreases. These findings demonstrate the competing nature of CDW and superconductivity. Competing nature of these two phases was also revealed in the single crystal of LaPt_2Si_2 where CDW transition was seen at 85 K, which is lower than the polycrystalline sample and consequently superconducting transition was seen at 1.78 K, which is higher compared to the polycrystalline sample. We are also in the process of performing transport studies on LaPt_2Si_2 under high pressure to further establish the competing nature of superconductivity and charge density wave transition.