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ac-Calorimetric Measurements of $PrRu_4P_{12}$ under High Pressure

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We have performed ac-calorimetry measurements on $PrRu_4P_{12}$ under high pressure, and detected a jump in the $C_{ac}(T)$ at $T_{MI} \sim 60$ K up to 6 GPa. It is in agreement with the pressure phase diagram, determined by restivity measurements previously (Fig. 1). Any other anomalies were not observed at lower temperature down to 10 K and up to 6 GPa.

$PrRu_4P_{12}$ shows a metal-insulator and structural transition at $T_{MI} \sim 62$ K and ambient pressure [1-3]. At ambient pressure and well below T_{MI}, two inequivalent crystalline electrical field schemes are revealed [4]. Γ_1 and Γ_4 are located at the Pr1 and Pr2 sites surrounded by smaller and larger cubic Ru sublattices, respectively. Due to the Γ_4 ground state of Pr2, some ordering is required to release that finite entropy in low temperature region. We found metallization and a superconducting transition above 12 GPa [5]. In the metallic region, above 11 GPa, a kink-like anomaly in the $\rho(T)$ curve was observed at ~ 20 K (T_{A2}) above T_c, suggesting a possible phase transition.

In order to clarify the existence of phase transition, we have optimised the sample setting for ac-calorimetry measurements in a diamond-anvil cell for more precise investigation.

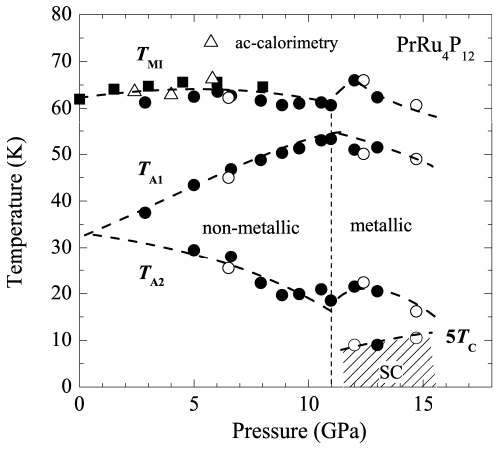

Figure 1: Pressure dependence of T_{MI}, T_{A1}, T_{A2} and T_c in $PrRu_4P_{12}$

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