Discovery of Superconductivity and Structural Phase Transition in Heusler Compound HfPd2Sn

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Searching for novel superconductors, in particular those competing with other ordering states, has been at the forefront of condensed matter physics. A new superconductor may attract considerable interests from the community, both on the fundamental pairing mechanism and its potential applications. In this article, we report the discovery of superconductivity and a structural phase transition in the Heusler compound HfPd2Sn. Polycrystals of HfPd2Sn were synthesized by arc-melting. Measurements of resistivity, heat capacity and magnetic susceptibility, using the Physical property measurement system PPMS, reveal a superconducting transition at Tc = 1.4 K and another phase transition around Ts = 90 K. The low-temperature X-ray diffractions (XRD) demonstrate a structural phase transition from the CuMn2Al-type cubic structure to the VRh2Sn-type tetragonal structure upon cooling the system down to Ts = 90 K, below which it shows characteristics of a charge density wave (CDW) order. These findings suggest that HfPd2Sn may represent a new candidate for studying the interplay between superconductivity and structural instability/CDW order.

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