

Surprising Transition-Metal Silicides

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We present a brief overview of the basic physical properties of FeSi, $(\text{Fe}_{1-x}\text{Co}_x)\text{Si}$ and MnSi. These compounds have recently undergone a resurgence of attention due their strong electron correlations and quantum critical effects. FeSi is the only 3d-electron Kondo insulator characterized by the opening of a correlation gap as the temperature is lowered. When doped with Co it becomes a half-metallic ferromagnet but less shiny or reflecting in the magnetic state. MnSi lacks inversion symmetry in its cubic B20 crystal structure and below 30K develops a long wavelength helical spin density wave. The magnetic state can be tuned with pressure and field leading to a new partially order state and a putative quantum critical end point. Our measurement probes include resistivity, optical conductivity and scanning tunnelling spectroscopy.