Complex magnetic phenomena in the f-electron intermetallic compounds

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The *f*-electron intermetallic compounds are materials with interesting magnetic properties. This work concentrates on the ternary compounds containing *4f*-electrons (rare earth) or *5f*-electrons (actinides) elements (denoted here as M) transition metals (denoted as T) and the elements of the fourth or fifth group (denoted as X). The intermetallic $M_nT_mX_p$ phases have been found to exhibit not only wide range of composition (n:m:p), but also a large variety of crystal structure types and magnetic properties. The influence of the crystal structure on the magnetic properties are discussed.

In the work the magnetic properties of new materials for permanent magnets and "giant" magnestriction materials are discussed. Investigations of new magnetic systems with strong electron correlations and thermoelectric materials are also presented. Then the systems with frustrated magnetic state such as collinear incommensurate, helimagnetic, fan, long-period commensurate or antiphase structures are briefly described and the role of anisotropy in the existence of these systems as well as temperature dependence of there structures is discussed. The influence of external magnetic field and pressure on changes in the magnetic structure and their role in inducing phase transitions from the magnetic ordered to the superconducting states is reported. Finally the electronic structure and its influence on the magnetic properties of these compounds is discussed.

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