

Magnetic Susceptibility Experiments on the Heavy Lanthanides Using Designer Diamond Anvils

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The high pressure magnetic properties of the heavy lanthanide elements Gd, Tb, Dy, Ho, Er, and Tm have been investigated by ac magnetic susceptibility using designer diamond anvils. It is found that the magnetic transition temperatures monotonically decrease with increasing pressure. In addition, the amplitudes of the magnetic transition signals decrease with increasing pressure, with the signals all eventually disappearing at pressures by 20~GPa. The transition temperatures, T_{Crit} are all found to drop at a rate proportional to their de Gennes factor, and the values of $T_{Crit}/T_{Crit}(P=0)$ vs P/P_{Crit} , where P_{Crit} is the pressure where the magnetic transition disappears, all sit on a single phase diagram.

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