Magnetic properties of GdPdX (X = Al, Si, Ga, Sn, Ge, In) intermetallics

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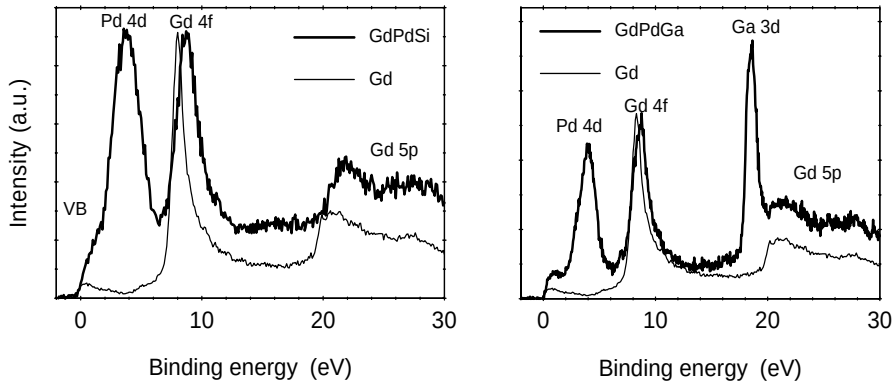
Recently single crystals of GdTAl (T = Ni, Rh, Pd) were widely examined. GdNiPd and GdPdAl belong to the ternary intermetallics with unstable crystal structure [1-3]. These crystals crystallized in the hexagonal ZrNiAl – type structure. The single crystals of GdRhAl grown by the Czochralski method crystalize in the orthorhombic TiNiSi structure. Rhodium, like palladium belongs to the *4d* transition metals, is situated just before palladium in the periodic table and posses eight *4d* electrons. GdRhAl crystallizes in the stable orthorhombic structure similar to the other GdPdX compounds (X = Al, Si, Ga, Ge, In, Sn). In these investigations the sample with Al was polycrystalline and showed TiNiSi structure. For all these compounds no structural and magnetic anomalies were found. The ordering temperatures of GdRhAl and GdPdX are similar and they are close to 30 K. This suggests that not only the number but also the spatial distribution of the sp electrons that, take part in the very important hybridization process, influence the crystal structure and magnetic properties of the examined compounds. A very small thermal broadening of the ESR resonance linewidths observed in these compounds indicates a small value of conduction electron – lattice relaxation rate. This result corresponds with less participation of d electrons in relaxation processes than it was observed in GdNiAl and GdRhAl.



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