intermetallics with $RE = \mathrm{La, Eu, Gd, Yb}$ and $T = \mathrm{Ag, Au}$ and of GdAuIn. Depending on the composition these compounds are paramagnetic ($RE = \mathrm{La, Yb}$) or they order either ferro- or antiferromagnetically with transition temperatures ranging from about 13 to 81 K. All of them are metallic, but the resistivity varies over 3 orders of magnitude. We find pronounced magnetoresistance effects around the ordering temperature. The magnetic ordering leads also to well-defined anomalies in the specific heat. An analysis of the entropy change leads to the conclusions that generally the magnetic transition can be described by an ordering of localized $S = 7/2$ moments arising from the half-filled $4f^7$ shells of Eu^{2+} or Gd^{3+}. The magnetocaloric effect is weak for the antiferromagnets and rather pronounced for the ferromagnets for low magnetic fields around the zero-field Curie temperature. The antiferromagnetic order of GdAuIn can be suppressed in a field about 15 T. Furthermore GdAuIn shows a new phase boundary inside the antiferromagnetic phase.

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Structural and magnetic properties of Mn_5Ge_3 clusters in a dilute magnetic germanium matrix — •Christian Jaeger[1], Christoph Bihler[1], Dieter Schlosser[1], Thomas Vallaitis[2], Mario Gjukic[1], Martin S. Brandt[1], Eckhard Pippel[3], Jörg Woltersdorf[3], and Ulrich Gösele[3] — [1]Walter Schottky Institut, Technische Universität München, Am Coulombwall 3, 85748 Garching, Germany — [2]Universität Karlsruhe (TH), Institute of High-Frequency and Quantum Electronics, Engesserstr. 5, 76131 Karlsruhe, Germany — [3]Max-Planck-Institut für Mikrostrukturphysik, Weinberg 2, 06120 Halle, Germany

Measurements of the total magnetization of Ge:Mn show that in many samples ferromagnetic inclusions must be present. We have characterized the structural and magnetic properties of low-temperature molecular-beam epitaxy (LT-MBE) grown Ge:Mn by means of high-resolution transmission electron microscopy (HR-TEM), energy dispersive x-ray spectroscopy (EDXS), and superconducting quantum interference device (SQUID) magnetometry. We find a coherent incorporation of Mn_5Ge_3 clusters in an epitaxially grown Ge:Mn matrix, which shows the characteristics of a diluted magnetic semiconductor (DMS) phase of Mn-doped Ge. The clusters are preferentially oriented with the hexagonal [0001] direction parallel to the [001] growth direction of the Ge:Mn matrix, as determined from both HR-TEM and SQUID measurements.

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Single crystal growth and magnetic structure investigations of Er_2PdSi_3 and Tm_2PdSi_3 intermetallic compounds. — •Irina Mazilu [1], Wolfgang Löser[1], Günter Behr[1], Matthias Frontzek[2], Jürgen Eckert[3], and Ludwig Schultz[1] — [1]IFW Dresden, P.O. Box 270116, D-01171 Dresden, Germany — [2]Institute for Physics of Solids, TU Dresden, D- 01062 Dresden, Germany — [3]Material Science Department, TU Darmstadt, D-64287 Darmstadt, Germany

R_2PdSi_3 (R = rare earth) intermetallic compounds exhibit a hexagonal AlB2 type crystal structure. They show strongly anisotropic magnetic properties and complex magnetic ordering. Er_2PdSi_3 and Tm_2PdSi_3 single crystals were grown by a floating zone technique with radiation heating in a vertical double ellipsoid configuration. The principal features of the growth process have been investigated and will be discussed.

Magnetic susceptibility and magnetization measurements of the single crystal samples reveal an antiferromagnetic order, with transitions temperatures for Er_2PdSi_3 and Tm_2PdSi_3 of 7 K and 2 K, respectively. The investigations which have been performed on samples with different crystallographic orientation, show a pronounced anisotropy of properties which primarily depends on the 4f-orbital shape of the rare earth element. Neutron diffraction experiments have been performed from 0.4 K to 300 K on the Er_2PdSi_3 and Tm_2PdSi_3 single crystals. The magnetic easy axis is along the c-axis of the hexagonal structure for both compounds, whereas the propagation vectors are τ = (0.11 0.11 0) for Er_2PdSi_3 and τ = (1/2 1/2 1/16) for Tm_2PdSi_3.

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X-ray Magnetic Circular Dichroism (XMCD) study of Re and W in ferrimagnetic double perovskites Sr_2CrMO_6 (M = Re, W) — •S. Gepraegs[1], P. Majewski[1], O. Sanganas[1], M. Opel[1], R. Gross[1], F. Wilhelm[2], A. Rogalev[2], and L. Alff[3] — [1]Walther-Meissner-Institut, Bayerische Akademie der Wissenschaften, Walther-Meissner-Str. 8, 85748 Garching — [2]European Synchrotron Radiation Facility (ESRF), 6 Rue Jules Horowitz, BP 220, 38043 Grenoble, Cedex 9, France — [3]Darmstadt University of Technology, Petersenstr. 23, 64287 Darmstadt

Among the ferrimagnetic double perovskites in the compounds Sr_2CrReO_6 and Sr_2CrWO_6 high Curie temperatures well above room temperature have been found experimentally and half-metallicity (resp. pseudo-half-metallicity) was predicted by band-structure calculations. These strong ferromagnetic order can at least qualitatively be understood within a generalized double exchange or kinetic energy driven exchange model where the itinerant electrons mediate an antiferromagnetic alignment between the Cr or Fe and the W or Re moments.

We have measured Re and W $5d$ spin and orbital magnetic moments in the double perovskites Sr_2CrReO_6, Sr_2CrWO_6, and Sr_2FeWO_6 by X-ray magnetic circular dichroism (XMCD) at the L2,3 edges. Our results are in good agreement with recent band-structure calculations. We find that the Curie temperature in the double perovskites $A_2BB'O_6$ scales with the spin magnetic moment of the 'non-magnetic' B' ion. This work was supported by the DFG (GR 1132/13), the BMBF (project no. 13N8279), and the ESRF (HE-1658, HE-1882).

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XPS and Mössbauer studies of grain boundary effects in highly ordered Sr_2FeMoO_6 — •M. Raekers[1], C. Taubitz[2], K. Kuepper[2], H. Hesse[1], I. Balasz[3], I. G. Deac[3], S. Constantinescu[4], M. Valeanu[4], E. Burzo[3], and M. Neumann[1] — [1]Universität Osnabrück, Fachbereich Physik, Barbarastr. 7, D-49069 Osnabrück, Germany — [2]Institut für Ionenstrahlphysik und Materialforschung, Forschungszentrum Rossendorf, 01314 Dresden, Germany — [3]Faculty of Physics, Babes-Bolyai University, 3400, Cluj-Napoca, Romania — [4]National Institute of Materials Physics, P.O. Box MG-07, Bucharest, Romania

Sr_2FeMoO_6 is magneto resistance (MR) compound which has attracted much attention in the last years. Our work group has already studied this compound intensely[1,2]. Here we present the oxidation states of Fe and Mo and the presence of grain boundaries in the magneto resistance (MR) compound Sr_2FeMoO_6 by means of x-ray photoelectron spectroscopy (XPS) and Mössbauer spectroscopy. XPS of the Mo 3d and Fe 3s core levels is indicating a mixed valence state involving around 30% Fe^{3+}- Mo^{5+} and 70% Fe^{2+}- Mo^{6+} states. Mössbauer studies confirm the presence of a valence fluctuation state and an essential amount of grain boundaries in the present Sr_2FeMoO_6 crystal. The influence of the grain boundaries will be discussed.

[1] J. Phys.: Condens. Matter 17 (27): 4309-4317 (2005)
[2] phys. stat. sol. (a), 201, No. 15, 3252-3256 (2004)

MA 20.149 Tue 15:15 P1

Dilatometry under magnetic field of the magnetic quasicrystal Zn-Mg-Tb — •William Knafo[1,2], Christoph Meingast[1], Paul Popovich[1], Hilbert von Löhneysen[1,2], Hiroyuki Takakura[3], and Akira Inaba[3] — [1]Forschungszentrum Karlsruhe, Institut für Festkörperphysik, D-76021 Karlsruhe, Germany. — [2]Physikalisches Institut, Universität Karlsruhe, D-76128 Karlsruhe, Germany. — [3]Research Center for Molecular Thermodynamics, Graduate School of Science, Osaka University, Toyonaka, Osaka 560-0043, Japan.

The magnetic quasicrystal Zn-Mg-Tb is characterized by a freezing temperature $T_f \simeq 6$ K below which the moments localized on the Tb sites follow a spin glass behavior [1]. Short range magnetic correlations have also been reported below a second characteristic temperature $T_{corr} \simeq 20$ K [2]. The spin freezing behavior of Zn-Mg-Tb is probably related to the set up of competing magnetic correlations, such as in the Kagomé or pyrochlore geometrically frustrated systems. We present here a study of the magnetic quasicrystal Zn-Mg-Tb using thermal expansion and magnetostriction for magnetic fields up to 10 T. The effects of the temperature and magnetic field on the magnetic correlations will be related to those measurements.

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