MAGNETIC PROPERTIES AND MAGNETIC ENTROPY CHANGE IN TERNARY RARE EARTH INTERMETALLICS

M.Duraj\textsuperscript{a} and A.Szytula\textsuperscript{b}

\textsuperscript{a}Institute of Physics, Technical University of Cracow, Podchorażychnych 1, 30-084 Kraków, Poland
\textsuperscript{b} Institute of Physics, Jagiellonian University, Reymonta 4, 30-059 Kraków, Poland

In this work the magnetic properties, magnetic phase transitions and magnetic entropy changes in polycrystalline ternary rare earth intermetallic compounds are discussed. These compounds crystallize in the tetragonal ThCr$_2$Si$_2$-type structure with the space group I4/mmm. It is known that the magnetic properties of these compounds are sensitive to the atomic distance and the magnetic structure can be easily modified by external pressure, temperature and magnetic field. The general magnetic phase diagrams for Sm$_{1-x}$Gd$_x$Mn$_2$Ge$_2$ are similar to those observed for SmMn$_2$Ge$_2$ under external pressure. For $0 \leq x \leq 0.6$ a typical SmMnGe$_2$-like magnetic behavior is observed. In this paper, we discussed the magnetic entropy change $\Delta S_M$ and magnetic properties deduced by the magnetization and structural properties. For Sm$_{1-x}$Gd$_x$Mn$_2$Ge$_2$ with $x = 0, 0.1, 0.15$, the value of relative volume $\Delta V/V$ at magnetic phase transition is negative at $T_1$ and positive in $T_2$. The magnetic entropy change is found to be $|\Delta S_M(T_1)| = 0.96 \pm 1.34$ JK$^{-1}$mol$^{-1}$ at the re-entrant ferromagnetic transition and $|\Delta S_M(T_2)| = 1.05 \pm 1.24$ JK$^{-1}$mol$^{-1}$ at the antiferro-ferromagnetic one.

Subject category :
3. Magnetic Structure and Dynamics

Presentation mode :
poster

Corresponding author :
Małgorzata Duraj

Address for correspondence :
Institute of Physics
Technical University of Cracow
Podchorażychnych 1
30-084 Kraków, Poland

Email address :
mduraj@poczta.onet.pl