SECOND SEEHEIM CONFERENCE ON MAGNETISM

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PROGRAM AND ABSTRACTS

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http://www.tu-darmstadt.de/magnetism
The magnetoconductance (MR) measurement of the sample $x=0.1$ show that the metal-semiconductor transition occur in the temperature range from 77 to 295 K, while the only semiconducting behavior is shown in whole temperature range for the sample $x=0.3$. The resistance is described well by Arrhenius model in the region $T<100$ K, while the small polaron model is fitted well in the region $T>200$ K, for the both samples. The magnetization increases from 37.2 to 45.1 emu/g, with increase of Ga from 0.1 to 0.3, under 5 kOe external field at 30 K. It proves that the magnetic interaction is ferrimagnetic and this result is in agreement with the Mössbauer analysis. The Mössbauer spectra were collected from 12 to 295 K. We notice that the quadrupole splitting of the A site largely increased for the sample, compared to that of the B site. It is noticeable that Ga ions stimulate asymmetric charge distribution of Fe ions in the A site. The ratio of the electric quadrupole to the magnetic dipole interaction rapidly decrease up to 150 K, with increasing temperature. The temperature dependence of quadrupole interaction leads to the conclusion that orbital angular contribution plays an important role in $\text{FeGa}_x\text{Cr}_{2-x}\text{S}_4$. 