



# Soft Magnetic Materials Conference (SMM 18)



## Book of Abstracts



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## MAGNETIC PROPERTIES OF THE NiGa<sub>2</sub>S<sub>4</sub> AND Ni<sub>0.99</sub><sup>57</sup>Fe<sub>0.01</sub>Ga<sub>2</sub>S<sub>4</sub>

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The synthesis of the NiGa<sub>2</sub>S<sub>4</sub> and Ni<sub>0.99</sub><sup>57</sup>Fe<sub>0.01</sub>Ga<sub>2</sub>S<sub>4</sub> was accomplished by the direct reaction of the high-purity elements Fe, Ni, Ga, S, in an evacuated 10<sup>-6</sup> torr quartz tube. The samples were heated at 1000 °C for 72 h and the slowly cooled down to room temperature at a rate of 0.2 °C/min. The structure of the samples was examined using x-ray diffractometer (XRD) and analyzed by the Rietveld refinement. The crystal structure of the NiGa<sub>2</sub>S<sub>4</sub> is determined to be trigonal structure  $P\bar{3}m1$  with its lattice constants  $a = 3.634 \text{ \AA}$ ,  $b = 3.634 \text{ \AA}$ ,  $c = 12.023 \text{ \AA}$  respectively. The cation and anion parameters are determined to be Ni(0,0,1/2), Ga(1/3,2/3,0.215), S<sub>1</sub>(1/3,2/3,0.874), S<sub>2</sub>(1/3,2/3,0.420). The magnetic behavior shows an antiferromagnetic behavior. The Mössbauer spectra on Ni<sub>0.99</sub><sup>57</sup>Fe<sub>0.01</sub>Ga<sub>2</sub>S<sub>4</sub> were recorded using a conventional spectrometer with a <sup>57</sup>Co source in a rhodium matrix at temperatures ranging from 4.2 to 300 K. It shows Fe site value of isomer shift shows that all of the temperature range the states are ferrous.

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