Substitution effects on the magnetic properties of Fe-containing chalcogenides with NiAs-type structures

N.V. Baranov,[1] N.V. Selezneva,[2] E.M. Sherokalova,[2] A.S. Volegov,[2] and D.A. Shishkin[1]

[1] *Institute of Metal Physics, Russian Academy of Science, 620990, Ekaterinburg, Russia*

[2] *Institute of Natural Sciences and Mathematics, Ural Federal University, 620083, Ekaterinburg, Russia*

Iron-containing chalcogenides $(Fe,M)_{1-z}X$ (X = S, Se) with layered crystal structures of the NiAs-type exhibit a rich variety of magnetic behaviors depending on the kind and concentration of substituting M atoms as well as on the Se for S substitution. The present work aims to study the magnetization processes in $(Fe,Ti)_{1-z}X$ compounds (z = 0.125 – 0.25; X = S, Se) with antiferromagnetic and ferrimagnetic orderings. At low temperatures, unusually high values of the coercive fields (up to 50 kOe) associated with the presence of an unquenched orbital moment on Fe ions have been observed in some $(Fe,Ti)_{1-z}X$. A cation distribution between layers together with changes in the metal-chalcogen ratio are observed to affect the magnetic properties of $(Fe,Ti)_{1-z}X$.

This work was supported by the RFBR (projects No 16-02-00480 and 16-03-00733) and by the Ministry of Education and Science of Russia (project No 3.2916.2017)