НИИ ФИЗИКИ ЮЖНОГО ФЕДЕРАЛЬНОГО УНИВЕРСИТЕТА

МЁССБАУЭРОВСКАЯ СПЕКТРОСКОПИЯ И ЕЕ ПРИМЕНЕНИЯ

Сборник материалов XV Международной конференции

Сочи, 10— 16 сентября 2018 г.

Ростов-на-Дону
2018

УДК 548.9 + 53.043 + 543.429.3
ББК

Составители:
С.П. Кубрин,
К.В. Фролов,
Д.А. Сарычев,
И.С. Любутин

М53 **Мёссбауэровская спектроскопия и ее применения:** сборник материалов XV Международной конференции (Сочи, 10– 16 сентября 2018 г.); Южный федеральный университет. – Ростов-на-Дону ; Таганрог : Издательство Южного федерального университета, 2018. – 188 с илл.
ISBN 978-5-9275-2831-8

Сборник включает в себя программу и тезисы докладов участников XV Международной конференции «Мёссбауэровская спектроскопия и ее применения», проводившейся в г. Сочи 10 – 16 сентября 2018 г.

УДК 548.9 + 53.043 + 543.429.3
ББК

ISBN 978-5-9275-2831-8

Mössbauer study of iron-based superconductor $Fe_{1.09}Se_{0.5}Te_{0.5}$

Kiiamov A.G.[1], Ivanova A.G.[1], Vagizov F.G.[1], Tayurskii, D.A.[1], Tagirov L.R.[1,2], Tsurkan V.[3,4], and Loidl A.[4]

[1]Institute of Physics, Kazan Federal University, Kazan (Russia)
[2]Zavoisky Physical-Technical Institute, FRC Kazan Scientific Center of RAS, Kazan (Russia)
[3]Institute for Applied Physics, Academy of Sciences of Moldova, MD-2028, Chisinau (Moldova)
[4]Experimental Physics V, Centre for Electronic Correlations and Magnetism, University of Augsburg, Augsburg (Germany)
19ivanova91@gmail.com

Since discovery of superconductivity in iron-based compounds [1], the iron selenide is in the focus of world-wide investigations of iron-based superconductors. Numerous papers reported that superconducting transition critical temperature of Te-doped FeSe increases [2, 3]. At room temperature, FeSe and FeTe compounds have quite similar layered crystal structure that simplifies Te-doping of FeSe compound [3]. Nevertheless, it is well known that $Fe_{1+y}(Se_{1-x}Te_x)$ systems always contains excess iron atoms which affect the electronic and magnetic properties. The recent neutron diffraction studies of a number of Fe(1+*y*)Te samples have shown that presence of the excess iron (*y*) complicates the magnetic ordering in these systems [4]. It was reported for Fe1.05Te system that the excess iron atoms lead to appearance of four nonequivalent centers of iron atoms with different hyperfine parameters [3].

We present Mössbauer studies of the influence of excess iron atoms on the properties of ironbased superconductor Fe1.09Se0.5Te0.5. Mössbauer spectra were collected in a temperature range from liquid helium up to room temperature. The temperature dependences of hyperfine parameters was investigated. The Mössbauer spectra have shown a complex shape and could be treated with a model based on first principle density functional theory calculation results similar to that in Ref. [3]. The reported study was funded by RFBR according to the research project No 18-32-00342.

REFERENCES

1. *Hsu F.C.* Superconductivity in the PbO-type structure α-FeSe / F.C. Hsu, J.Y. Luo, K.W. Yeh, *et al.* // Proc. Nat. Acad. Sci. – 2008. – V. 105,N38. – P. 14262–14264.
2. *Yeh K.W.* Tellurium substitution effect on superconductivity of the α-phase iron selenide /K.W. Yeh, T.W. Huang, *et al.* // EPL (Europhysics Letters). – 2008. – V. 84,N3. – P. 37002.
3. *Kiiamov A.G.* Mössbauer spectroscopy evidence of intrinsic non-stoichiometry in iron telluride single crystals / A.G. Kiiamov, Y.V. Lysogorskiy, F.G. Vagizov, *et al.* // Annalen der Physik. – 2017. – V. 529,N4. – P. 1600241.
4. *Stock C.* Competing spin density wave, collinear, and helical magnetism in $Fe_{1+x}Te$ /C. Stock, E.E. Rodriguez, *et al.* // Physical Review B. – 2017. – V. 95,N14. – P. 144407.