

⁵⁷Fe Mössbauer spectroscopy study of the Fe-bearing, Ge,Ga-rich synthetic tourmalines**O.A. Anosova¹, K.V. Frolov¹, T.V. Setkova², E.Yu. Borovikova³**¹*Shubnikov Institute of Crystallography of FSRC "Crystallography and Photonics" RAS, 119333 Moscow, Russia*²*D.S. Korzhinskii Institute of Experimental Mineralogy RAS, 142432 Chernogolovka, Russia*³*Faculty of Geology, Moscow State University, Vorobievsky Gory, 119991 Moscow, Russia**lrm@crys.ras.ru*

Borosilicate mineral tourmaline is one of the most widespread minerals in nature, one of the most popular gems and promising piezoelectric, adsorption material [1,2]. Synthetic Ga,Ge-rich analogue is structure model of tourmalines at high pressure. This work presents the results of Mössbauer studies of Ga,Ge-rich tourmaline crystals which contain a significant iron content. The crystals were grown in hydrothermal boric, boric-alkaline, boric-fluoride solutions at 650 °C and 100 MPa [3,4]. The chemical composition of the five studied tourmaline crystals in atoms per formula unit, calculated based on the 15 ($T + Y + Z$) atoms, is shown in Table 1.

Table 1

№	Si	Ge	Al	Fe	Ga	Ni	Ti	Ca	Na
60/8	5.61	1.16	5.75	2.00	1.06	0.26	0.16	0.00	0.46
60/7	4.86	0.81	6.11	1.89	1.23	0.03	0.07	0.00	0.47
60/5	5.48	0.22	7.46	1.06	0.73	0.05	0.00	0.04	0.05
59/26	5.44	0.21	5.46	1.26	2.56	0.00	0.07	0.05	0.61
63/6	5.51	0.55	6.94	1.58	0.57	0.19	0.00	0.00	0.00

The ⁵⁷Fe Mössbauer absorption spectra were measured at room temperature on a standard MS-1104Em spectrometer with a ⁵⁷Co (Rh) source. The structural and electronic states of iron ions have been studied and refined. A comparison is made with the results of X-ray diffraction measurements.

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