Neutron diffraction and Mössbauer study of the magnetic structure of YFe$_6$Sn$_6$

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We have used time-of-flight (TOF) neutron powder diffraction, and both $^{57}$Fe and $^{119}$Sn Mössbauer spectroscopy over the temperature range 2–600 K to determine the magnetic ordering mode of the Fe sublattice in YFe$_6$Sn$_6$. The crystal structure is orthorhombic (space group Immm). The Fe sublattice orders antiferromagnetically with a Néel temperature of 558(5) K. The TOF neutron diffraction patterns obtained at 4 and 293 K show that the antiferromagnetic ordering of the Fe sublattice is along [100] with a propagation vector $\mathbf{q}=\{010\}$. The magnetic space group is $I_{\overline{p}m'm'\overline{m}}$. This magnetic structure is confirmed by our $^{119}$Sn Mössbauer spectra. © 2000 American Institute of Physics.

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