

Magnetic Hyperfine and Quadrupole Interactions of an Fe Ion in NiCr_2S_4

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$\text{Ni}_{0.985}\text{Fe}_{0.015}\text{Cr}_2\text{S}_4$ has been studied by Mössbauer spectroscopy and x-ray diffraction. The crystal structure is found to be monoclinic with the lattice parameters $a=5.909 \text{ \AA}$, $b=3.399 \text{ \AA}$, $c=11.10 \text{ \AA}$, and $\beta=91.14^\circ$. Magnetic hyperfine and quadrupole interactions in the antiferromagnetic state at 81 K have been studied, yielding the following results: $H=132 \text{ kOe}$, $\frac{1}{2} e^2 q Q (1 + \frac{1}{3} \eta^2)^{\frac{1}{2}} = -2.14 \text{ mm/s}$, $\theta=53.0^\circ$, $\phi=70.0^\circ$, and $\eta=0.4$.