

Electronic Energy Levels of Iron Ions in NiCr_2S_4

Chul Sung Kim

Department of Physics, Kookmin University, Seoul 136-702

Jae Yun Park

Department of Materials Science and Engineering, Incheon University, Incheon 402-749

Hyung Choi and Hang Nam Ok

Department of Physics, Yonsei University, Seoul 120-749

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Electronic energy levels of iron ions in NiCr_2S_4 have been studied by Mössbauer and X-ray techniques. It is found that the ground orbital state is well separated from the first excited one by 4296 K, thereby making the quadrupole splitting insensitive to temperature. The magnetic hyperfine field and quadrupole splitting at 11 K are found to be 165 kOe and -2.10 mm/s, respectively, which can be explained in terms of a Hamiltonian involving crystal field energy, spin-orbit couplings, and exchange interactions.