
Mössbauer Spectroscopic Identification of Iron Oxides in Nontronite from Hohen Hagen, Federal Republic of Germany

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Abstract: Iron impurities in the Hohen Hagen nontronite (NG-1) were identified as maghemite and goethite. The phase identified as maghemite was magnetically ordered at both room temperature and 87 K, with hyperfine magnetic fields of 48.6 and 50.7 tesla, respectively. Due to the magnetic properties of this phase, it was easily separated from aqueous dispersions of the clay using a hand magnet. X-ray powder diffraction analysis revealed maghemite, quartz, and phyllosilicate in the magnetically separated phase. The impurity identified as goethite remained in the non-magnetic <2- μm fraction of the clay, displayed magnetic order only at 87 K (47.44 tesla hyperfine field), and accounted for about 8% of the total area of the Mössbauer spectrum.

Key Words: Goethite • Iron • Maghemite • Magnetic properties • Mössbauer spectroscopy • Nontronite

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