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**High-pressure Synchrotron Mössbauer Spectroscopy on  $\text{Fe}_4\text{O}_5$**   
KARUNAKAR KOTHAPALLI, HIPSEC, Physics and Astronomy, University of Nevada, Las Vegas, NV, USA, TOMASZ KOLODZIEJ, AGH University of Science & Technology, Krakow, Poland, EUNJA KIM, HIPSEC, Physics and Astronomy, University of Nevada, Las Vegas, NV, USA, ERCAN ALP, Advanced Photon Source, Argonne National Laboratory, Argonne, IL, USA, BARBARA LAVINA, HIPSEC, Physics and Astronomy, University of Nevada, Las Vegas, NV, USA —  $\text{Fe}_4\text{O}_5$  is a recently discovered compound belonging to the Fe-O binary system. We report the first insights on its properties as revealed by high pressure  $^{57}\text{Fe}$  Synchrotron Mössbauer Spectroscopy (SMS) performed at several different pressures in the range 0-48GPa.  $\text{Fe}_4\text{O}_5$  first synthesized in the diamond anvil cell at a pressure of about 10 GPa and 1800 K, is a high pressure phase recoverable in ambient conditions. It crystallizes in the orthorhombic *Cmcm* spacegroup. The Fe atoms occupy three crystallographic positions – the 4a and 8f octahedral sites and 4c trigonal prism site. The SMS spectra could be fitted with just a single site and the Hyperfine Magnetic Field(HF) and Quadrapole Splittings(QS) were derived. The magnitudes of HF and QS indicate that the major contribution originates from high-spin  $\text{Fe}^{3+}$  ions. The HF and QS parameters show a linear dependence in the region 10-48 GPa. A significant change in QS below 10 GPa suggests a considerable deviation in the electronic contribution from the charge distribution of the surrounding electron shell. The magnetic structure and the pressure dependence of hyperfine parameters will be discussed in light of plausible contributions from the different Fe-sites and supporting theoretical calculations.

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