

Mössbauer Study of Iron Sulfide Nano-Compound

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The iron monosulfide (FeS) was fabricated by a polyol method. X-ray diffraction (XRD) patterns show that the sample has a troilite hexagonal structure (space group $P-62c$) with a lattice constant $a_0 = 5.985$, $b_0 = 5.985$, and $c_0 = 11.658$ Å. The hysteresis loop with maximum applied field 10 kOe at room temperature and zero field cooling (ZFC) curve with an applied magnetic field 200 Oe at temperature ranging from 50 to 450 K measured using a vibrating sample magnetometer (VSM) show the ferrimagnetic behavior. Mössbauer absorption spectrum shows 2-sextets at room temperature, while it shows a clear 1-sextet at 4.2 K. We conclude that it has ferrimagnetic property at room temperature as pyrrhotites (Fe_{1-x}S) by analysis of Mössbauer spectrum.

Index Terms— α transition, Mössbauer spectroscopy, pyrrhotite, troilite.