SOFT MAGNETIC MATERIALS 16

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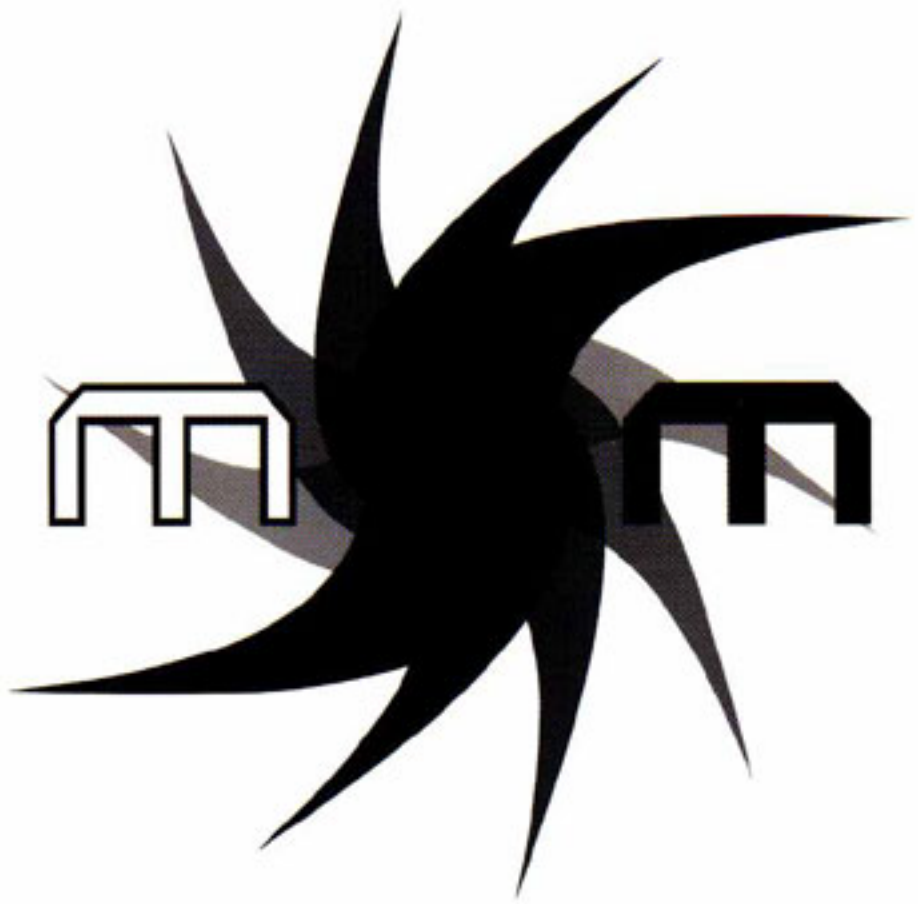

ABSTRACTS

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MÖSSBAUER STUDIES OF Fe/MgOwrite

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Fe/MgO powders were prepared by an impregnation of MgO with aqueous iron nitrate solutions, followed by drying at 373 K and subsequent calcination in air for 5 hours at 733 K. The powders were designed as Fe (weight percentage)/MgO. In order to determine matgnetic behavior and ion state of Fe/MgO, we carried out Mössbauer measurement. All of samples were indicated the doublet (2 line) pattern at room temperature, but with increasing Fe concentration, the sextet (6 line) pattern started to appear and to increase from 24.5 % for 6 wt. % to 91.1 % for 30 wt. % at 14 K. Hyperfine field also increased from 386 to 446 kOe for A-site and from 454 to 491 kOe for B-site. It is considered that the ultrafine particles of the sextets can be mainly attributed to the spinel formation ($MgFe_2O_4$) from the observation of the A-site and B-site. Increasing the reaction time, relative area of sextet increaed in the Mössbauer spectra at 14 K bacause of increasing of the agglomeration of the paramagnetic Fe^{3+} cations. However, in the Mössbauer spectra at room temperature, the only doublet pattern indicated. It is considered that the superparamagnetic phase and paramagnetic phase coexist in the Fe/MgO powders. Isomer shifts at room temperature and 14 K are in the range of 0.26 – 0.43 mm/s, which means that of the valence state of iron ions is ferric (Fe^{3+}).