

Mössbauer Investigation of γ -Fe₂O₃ Nanocrystals in Silica Matrix

Prepared by the Sol-gel Method

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A series of Fe₂O₃-SiO₂ nanocomposites (25 weight % of Fe₂O₃) has been prepared using a sol-gel method. Samples showing different features were obtained by varying the evaporation conditions acting on the surface / volume ratio of the starting sol. The samples were investigated using Mössbauer spectroscopy at low temperature. The Fe₂O₃ nanoparticles have been identified as maghemite (γ -Fe₂O₃) particles. The samples show a superparamagnetic behavior with a blocking temperature that depends on the average particle size.

Key words: Nanostructures; Oxides; Sol-gel Growth; Mössbauer Spectroscopy;
Magnetic Properties.