

Magnetic Properties of γ -Fe₂O₃ Nanopowder Synthesized by Atmospheric Microwave Torch Discharge

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A nanopowder containing γ -Fe₂O₃ particles was synthesized by adding a gas mixture of H₂/Fe(CO)₅ into a microwave torch discharge at 1 bar. The presence of γ -Fe₂O₃ phase was confirmed by powder X-ray diffraction (mean crystallite size $d_{\text{XRD}} = 24$ nm). The dominating characteristic sextets of γ -Fe₂O₃ were identified in the Mössbauer spectrum taken at 5 K. The presence of pure Fe₃O₄ in the nanopowder was excluded. The Mössbauer spectrum taken at 5 K exhibited six times larger total spectrum area than the Mössbauer spectrum taken at 293 K. Zero field cooled/field cooled curves measured down to 4 K in the magnetic field of 7.9 kA/m are reported.

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