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Synthesis of magnetite nanostructures with complex morphologies and effect of these morphologies on magnetic and electromagnetic properties

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Abstract

Magnetite nanostructures with different morphologies (tube, urchin and dendrite) were synthesized via hydrothermal method and consequent reduction by hydrogen gas. Magnetization and electromagnetic (EM) properties were characterized. The results showed that the morphology of the nanostructures has a major role in the microwave magnetic and dielectric properties. The surface area and shape isotropy are the key factors for changes in EM properties of different morphologies. High surface area and anisotropic elongated shape of the dendritic nanostructures lead to their high microwave permittivity, whereas for urchin-like nanostructures

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