

# Electromagnetic Response of $\text{SiO}_2@Fe_3O_4$ Core–Shell Nanostructures in the THz Regime

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## Abstract

### Abstract:

Magnetite ( $Fe_3O_4$ ) nanoparticles (NPs) of diameter 100 nm and nano-hollow spheres (NHSs) of diameter 100, 185, 250, 350, and 725 nm have been synthesized by a facile one-step template-free solvothermal technique. Silica ( $SiO_2$ ) coating on their surface has been carried out following the Stöber method. X-ray diffraction and high-resolution transmission electron microscope images confirmed the phase and morphology of the nanostructures (NSs). Furthermore, we have investigated the terahertz (THz) wave absorption properties of  $SiO_2@Fe_3O_4$  shell/shell NSs in the frequency range of 0.9–2.0 THz. Detailed morphology and size-dependent THz absorption study proves that these particles can be very useful as electromagnetic shielding devices.

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## Document Sections

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