MAGNETIC PROPERTIES OF BACTERIAL NANOPARTICLES

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9.7 cm

Magnetic nanoparticles in diluted aqueous suspensions are an important tool in medical diagnostics as contrast agent for magnetic resonance imaging and in therapy for magnetic drug targeting and hyperthermia. For these applications, special nanoparticles (magnetosomes) were isolated, which consisted of a magnetite core covered by a protein-containing lipid membrane. In our experiments bacterial magnetosomes were synthesized by magnetotactic bacteria *Magnetospirillum sp. strain* AMB-1. This bacteria is a Gram-negative α-proteobacterium that is more oxygen-tolerant and easier to grow on a large scale. The morphology was studied by Transmission Electron Microscopy (TEM) and magnetic properties by SQUID magnetometer. The XRD powder diffraction peaks fit very well with standard Fe_3O_4 reflections for used sample. The average particle size calculated by the Debye-Scherrer formula from XRD line width of the (311) peak was estimated to be 37 nm what corresponds with TEM measurementis. The temperature dependence of magnetization measurements in zero field (ZFC) and field cooling (FC) measurement mode presents the sharp magnetic transition (Verwey transition) at 105 K what is attributed to the fact that magnetosomes organized in chains act as long dipoles with enhanced magnetic anisotropy.

13.4 cm

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