

Magnetic susceptibility of magnetite nanoparticles in biological environments

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Biogenic magnetite (Fe_3O_4) has been found in a wide range of organisms, such as magnetotactic bacteria and homing pigeons. Magnetite nanoparticles are assumed to play a key role in the detection of the earth's magnetic field and are the basis for several magnetoreception hypotheses. However, the susceptibility of the particles as an important property is not very well defined. On the other hand this quantity largely determines the plausibility of those hypotheses. Magnetite nanoparticles from bacteria and particles similar to those found in pigeons have been investigated. The static and dynamic magnetic behavior found in experiments provides a solid base for further theoretical work. The particle size and environmental dependence of the magnetic susceptibility were the main targets of the analysis. The work is supported by DFG.