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Biomimetic Control of Magnetite Shape and Morphology using Polyaminoacids CEM LEVENT ALTAN, SEYDA BUCAK, T.C. Yeditepe University, NICO SOMMERDIJK, Eindhoven University of Technology — Inspired by nature, this work explores the use of randomly sequenced poly(aminoacids)s to control the size, morphology and magnetic properties of magnetite via synthetic methods in a controlled manner as in the case of magnetotactic bacteria. Aqueous partial oxidation and chemical precipitation methods are employed for the synthesis of 7 - 50 nm iron oxide nanoparticles at room temperature. X – ray diffraction (XRD) and Transmission Electron Microscopy (TEM) revealed formation of iron oxide nanoparticles both in the presence and absence of poly(amino acids). In the presence of random poly(amino acid)s with different compositions consisting of E, K and A amino acids the mean particle size for the chemical precipitation method is decreased regardless of amino acid composition. For partial oxidation method, mean particle size is also decreased and nanoparticle strings are observed while synthesized in the presence of poly(aspartic acid). Magnetic properties of particles obtained via different routes are also investigated. This provides a bio-inspired route for control over size, morphology and magnetic properties of magnetite nanoparticles.

Cem Levent Altan
T.C. Yeditepe University

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