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Iron et al.: Incorporation of Manganese in the Crystal Lattice of Magnetosome Magnetite TANYA PROZOROV, tprozoro@ameslab.gov, TERESA PEREZ-GONZALEZ, CONCEPCION JIMENEZ-LOPEZ, University of Granada, SURYA K. MALLAPRAGADA, ISU and US DOE Ames Lab, PAUL HOWSE, DENNIS A. BAZYLINSKI, University of Nevada, RUSLAN PROZOROV, ISU and US DOE Ames Lab — Incorporation of foreign metal into the crystal matrix of the magnetotactic bacterial magnetite has been attempted worldwide. Recently, presence of small amounts of cobalt and manganese in magnetosome magnetite crystals in cultured and uncultured magnetotactic bacteria, respectively, was reported. Magnetization of the uncultured cells and their magnetosomes were not determined, while only marginal changes in the magnetic properties of the cultured cobalt-grown cells and their magnetosomes were observed, however no evidence of incorporation of these metals into the crystalline lattice was presented. We grew cells of a magnetotactic bacterium, *Magnetospirillum gryphiswaldense* strain MSR-1, in the presence of manganese, ruthenium, zinc and vanadium, of which only manganese was incorporated within the magnetosome magnetite crystals. For the first time we demonstrate that the magnetic properties of magnetite crystals of magnetotactic bacteria can be significantly altered by the incorporation of metal ions, other than iron, in the crystal structure, as signaled by a major shift in the Verwey transition.

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