

PhD position (#2/3)

Title: Magnetite nanoparticles biosynthesized by magnetotactic bacteria

Character: Experimental

Context

Magnetite Fe₃O₄ nanoparticles present outstanding properties for biomedical applications due to their high magnetic susceptibility. A relatively unexplored method for the production of magnetite nanoparticles is the culture of magnetotactic bacteria. Magnetotactic bacteria are microorganisms that have the ability to align in and navigate along the geomagnetic field lines due to the presence of a chain of magnetosomes. These magnetosomes are magnetic nanoparticles covered by a lipid bilayer membrane. The type, shape and size of the magnetosomes depend on the species of magnetotactic bacteria. In particular, the bacterium *Magnetospirillum gryphiswaldense* MSR-1 produces magnetite, Fe₃O₄, cubo-octahedral shaped nanoparticles with an average size diameter of 50 nm and covered by a lipid bilayer membrane of around 2-4 nm. These nanoparticles are single domain, present high crystallinity, narrow size distribution and the lipid membrane is easy to functionalize. For all these reasons, these nanoparticles are especially interesting for biomedical applications.

Tasks

There are different tasks to aboard: (1) Produce biogenic magnetite in big scale (2) Study the biomineralization process of the magnetite (3) Collaborate with other research groups to prove the viability of the magnetosomes in different biomedical application: hyperthermia, drug delivery among others.

Methods to be used: (1) structural characterization: X-rays and neutron diffraction, TEM, X-ray Absorption spectroscopy, Raman spectroscopy, Dynamic Light Scattering. (2) Magnetic characterization: SQUID, VSM, magnetometers for DC and AC magnetization measurements.

Requirements

A Master on Materials Science, Condensed Matter Physics or similar. Candidates without a Master can also apply, provided they have been accepted into the Master on New Materials of the University of the Basque Country (UPV/EHU).

Application

Send a CV, motivation letter and two references to jobs@bcmaterials.net

Dead line: August 15th, 2012, 24:00 h GMT