

ESF – Short Visit Grant – Scientific Report

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Purpose of the Visit

I visited prof. Kenneth Dawson in the Centre for BioNano Interactions (CBNI) in Dublin from 20th to 22nd December 2011. The purpose of the short visit was to discuss and set up long term collaboration between CBNI and the Institution of Nanomaterials, Advanced Technologies and Innovation (Cxi), Technical University of Liberec. During the visit, we planned to set up basic directions for future research and possibilities of its funding via the EU project QNano Research Infrastructure.

Background

The long term objective of our work is to understand potential toxicity of zerovalent nanoiron particles in natural freshwaters. Particularly, I would like to characterize nanoparticle surface interactions with freshwater extracellular compounds and algal cells. Because the materials and system is quite new, next visits in the CBNI will be used to study the nature of the 'corona' of the zerovalent nanoiron. Although a different system than has been studied before, the paradigms are the same as those of protein corona studies. In freshwaters, nanoiron might effectively remove surplus orthophosphates and thus prevent formation of harmful cyanobacterial blooms. However, unique catalytic properties of nanoiron might have negative impact on indigenous organisms in the environment, and thus it is important to study reactions between nanoiron and various biotic or abiotic compounds before an in situ application.

Future collaboration with the host institution

During the year 2012, we are planning experimental characterization of behavior of different zerovalent nanoiron particles in various freshwater media in the Centre for BioNano Interactions. This project is intended to join the QNano Research Infrastructure.