POST-DOC POSITION IN THE FIELD OF

"Environmental chemistry / Nanotechnology"

supervised by Prof. Radek Zbořil, General Director, Regional Centre of Advanced Technologies and Materials (RCPTM), Department of Physical Chemistry, Palacký University Olomouc, Czech Republic (http://www.rcptm.com/about/page/radek-zboril/).

Project co-supervisor: Dr. Jan Filip, RCPTM

The Regional Centre of Advanced Technologies and Materials (RCPTM; www.rcptm.com) at Palacký University in Olomouc, Czech Republic, announces the opening of a new postdoc position for a scientist experienced in the field of environmental chemistry, nanotechnology and/or geochemistry with focus on reduction/oxidation/sorption and combined technologies of water and soil treatment based on nanoscale zero-valent iron nanoparticles, nanocomposites, nanosorbents and ferrates(VI).

The research program:

At RCPTM, we focus on the synthesis, characterization and laboratory-testing of nanomaterials based on zero-valent iron (including various composites), iron oxides and ferrates(FeVI, FeV, and FeIV) with the aim to optimize their physicochemical properties, stability, migration and reactivity for efficient application in technologies of water treatment. Nowadays, a huge interest is devoted to development and optimization of iron based reductants/oxidants (nZVI, ferrates) for advanced groundwater treatment. Moreover, the applied research expands to other types of water, new nanomaterial-based water treatment technologies and on removal of newly-emerging pollutants. Therefore, there is critical need for understanding the reaction mechanisms and ways, how to optimize properties of particular iron phases for their efficient and cost-effective application in pilot/full-scale remediation. The applicant will become part of a young, focused, and motivated international team with excellent equipment involving HRTEM, UHV/STM, XPS, EPR, NMR, AFM, Raman, SQUID, PPMS etc.

The requirements/responsibilities:

- Knowledge of interactions between solids and dissolved species, namely redox processes of water treatment (oxidation/reduction, but also sorption, surface complexation, catalysis etc.), ability to link the laboratory results with field experiments performed by cooperating partners.
- Laboratory evaluation of reactivity and reaction mechanisms of materials designed for water/soil treatment, surface modification of nanomaterials with the aim to enhance their reactivity, mobility, longevity and selectivity in specific environmental applications.
- Cooperation with practitioners, theoreticians and materials characterization experts.
- Ability to conduct, process and interpret data from electron microscopy (SEM, TEM), structural/phase analysis (XRD) and various spectroscopic techniques (XPS, FTIR etc.).
- Excellent English, independent manuscript writing

Relevant References in the Field

• Kralchevska, R.P., Prucek, R., Kolařík, J., Tuček, J., Machala, L., Filip, J., Sharma, V.K. & Zbořil, R. (2016): Remarkable efficiency of phosphate removal: Ferrate(VI)-induced in situ sorption on core-shell nanoparticles. – Water Research, 103, 83-91.

• Němeček, J., Pokorný, P., Lhotský, O., Knytl, V., Najmanová, P., Steinová, J., Černík, M., Filipová, A., Filip, J., Cajthaml, T. (2016): Combined Nano-Biotechnology for In-Situ Remediation of Mixed Contamination of Groundwater by Hexavalent Chromium and Chlorinated Solvents. – Science of the Total Environment, 563-564, 822-834.

• Prucek, R., Tuček, J., Kolařík, J., Hušková, I., Filip, J., Varma, R.S., Sharma, V.K. & Zbořil, R. (2015): Ferrate(VI)-Prompted Removal of Metals in Aqueous Media: Mechanistic Delineation of Enhanced Efficiency via Metal Entrenchment in Magnetic Oxides. – Environmental Science & Technology, 49, 2319-2327.

• Soukupova, J., Zboril, R., Medrik, I., Filip, J., Safarova, K., Ledl, R., Mashlan, M., Nosek, J. & Cernik, M. (2015): Highly concentrated, reactive and stable dispersion of zero-valent iron nanoparticles: Direct surface modification and site application. – Chemical Engineering Journal, 262, 813-822.

• Petala, E., Baikousi, M., Karakassides, M., Zoppellaro, G., Filip, J., Tucek, J., Konstantinos, C., Vasilopoulos, K., Pechousek, J. & Zboril, R. (2016): Synthesis, physical properties and application of the zero-valent iron/titanium dioxide heterocomposite having high activity for the sustainable photocatalytic removal of hexavalent chromium in water. – Physical Chemistry Chemical Physics, 18. 10637-10646.

• Filip, J., Karlický, F., Marušák, Z., Černík, M., Otyepka, M. & Zbořil, R. (2014): Anaerobic Reaction of Nanoscale Zerovalent Iron with Water: Mechanism and Kinetics. – Journal of Physical Chemistry C, 118, 13817-13825.

• Yates B.J., Zboril R., Sharma V.K. (2014): Engineering aspects of ferrate in water and wastewater treatment – a review. J.Environ.Sci.Health A 49, 1603-1614.

Formal requirements:

PhD or equivalent in any field of Chemistry or Material Science; good publication record, excellent oral and written English; experience in the field of environmental chemistry, green chemistry, water-treatment technologies and nanotechnology (particularly, zero-valent iron nanoparticles, iron oxides, nanocomposites and ferrates VI).

Submit an application including a curriculum vitae and a list of publications to:

jan.filip@upol.cz.

Letters of recommendation shall be sent directly to the same email addresses.

The position is opened till December 20, 2016.

Screening of applicants will resume immediately. Selected applicants will be invited for an interview.