

Annotation of Doctoral Thesis Topics for Degree Programme: Material Sciences and Engineering, course in „Biomaterials and Biocomposites“ for the Academic Year 2017/2018

Topic: Smart Magneto-sensitive Polymeric Materials for Environmental Applications

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Magneto-sensitive polymers with non-linear elastic characteristics of the polymers and magnetic properties of the particles allow these composite materials to act dramatically under external magnetic fields. The instantaneous response, and possibility to control the composite materials by tuning the external magnetic field, make these materials of special interest for the novel design of sensors for a fascinating variety of technological applications.

The doctoral study will focus on the synthesis of magnetic particles and hence embed the particles in polymers in its native form or as composites or copolymers. The key part will be the surface modifications of the magneto-sensitive polymer composite to achieve desirable interaction. The composite materials will be characterized using the instruments available at Tomas Bata University in Zlin. Beside characterization, interaction of these materials will be studied in a built in-house prototype for its efficiency.

Requirements:

Knowledge of general macromolecular chemistry and physics at the university level. Creative ideas and basic laboratory work skills. Good knowledge of the English language. Ability to work independently.

Literature:

1. An-Hui Lu, E. L. Salabas, and Ferdi Schth , Magnetic Nanoparticles: Synthesis, Protection, Functionalization, and Application, Willey.