

PHYSICAL CHEMISTRY

Effect of modification on the properties and degradation of Fe-Zn biomaterials.

supervisor: prof. RNDr. Renáta Oriňaková, DrSc.

study form: full time

Annotation: Effect of modification on the properties and degradation of Fe-Zn biomaterials. Preparation of biodegradable Fe-Zn biomaterials from metallic powders by replication method. Characterization of prepared biomaterials and investigation of its degradation, biocompatibility, and mechanical properties. Elucidation of the effect of modification of metallic powders or sintered Fe-Zn materials on properties of resulting biomaterials. Optimisation of preparation conditions of Fe-Zn biomaterials with higher degradation rate as compared to bare Fe biomaterials.

Nanocatalyst for CO₂ utilisation on methanol.

supervisor: prof. RNDr. Andrej Oriňak, PhD.

study form: full time

Annotation: Kinetics of nanosized catalyst will be studied in reaction of conversion CO₂ on methanol. Modelled will be effect of additives on efficiency nanocatalyst.

Nanotexture metal doped carboneus catalyst for conversion of methane on hydrogen.

supervisor: prof. RNDr. Andrej Oriňak, PhD.

study form: full time

Annotation: Studied will be influence of different pre – cursors added into micropore carboneus filament with nanotexture in conversion methane into hydrogen. Studied will be also kinetic factors and modelled will be influence of re-cursor on effectivity of catalyst.

Study of composite cathode materials based on sulfur for post-Li ion batteries

supervisor: doc. RNDr. Andrea Straková Fedorková, PhD.

study form: full time

Annotation: Preparation and characterization of new composite materials based on sulfur with conductive additives such as carbon, graphite, graphite oxide, polypyrrole and other. These materials will be tested as new cathodes for post-Li ion batteries where heavy metals are replaced by cheaper and environmentally benign materials. Different electrochemical techniques as cyclic voltammetry, electrochemical impedance spectroscopy or galvanostatic charge/discharge measurements will be used for characterization of as prepared materials. The main goal of this research is to improve the capacity and performance of new composite materials.