PHYSICAL CHEMISTRY

Nanomaterials based electrochemical sensors for detection of glucose.
supervisor: Assoc. Prof. Renáta Oriňaková, DrSc.
study form: full time
Anotation: Development of electrochemical non-enzymatic glucose sensors by modification of gold microelectrodes with metallic and/or carbon nanomaterials. Elucidation of the effect of structure, morphology and surface properties of nanomaterials on electrochemical performance of sensor for glucose detection. Study of the synergic action of nanomaterials and polymeric material used for fixation of nanoparticles onto the electrode surface. Much attention will be paid to increase the stability and sensitivity and decrease the limit of detection.

Nanomaterials for electrochemical detection of biomolecules.
supervisor: Assoc. Prof. Renáta Oriňaková, DrSc.
study form: full time
Anotation: Preparation and characterisation of nanosized materials for sensitive and selective electrochemical detection of biomolecules, such as cholesterol, dopamine, insulin. Elucidation of the effect of structure, morphology and surface properties of nanomaterials on their electrochemical activity. Investigation of the process of nanomaterials immobilisation onto the surface of electrode and the mechanism of nanomaterials interaction with selected biomolecules.

Study of functional nanosized surfaces deposited in polymer capillaries.
supervisor: prof. Dr. Andrej Oriňak, PhD.
study form: full time
Anotation: Miniaturization to the nanometer scale regime is a very prolific strategy for the development of new materials with novel and enhanced properties applicable in technology and biomedical application, including catalysis, drug delivery, diagnostic, solar cells, etc.. Deposition of metal layer to polymer capillary represents new impact to integration of functional materials into miniaturised system. Effect of hydrodynamic parameters, surface deposition and its functionality are the main objectives of this research. Candidate should have a good experiences in physical chemistry of hydrodynamic, metal deposition and chip construction.