



nano FORCE



Príspevok pre NanoDeal – generátor projektov



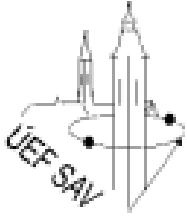
Chemický ústav SAV

Riesiteľ: Ján Tkáč

Projekt:

Preparation of lectin-based biochips and biosensors based on various nanomaterials for glycoprofiling of proteins applicable in diagnostics of various diseases

Lectin biochips/biosensors can detect changes in the glycan composition on the proteins. More than 70% of all proteins are glycosylated and in many cases a change in the glycan composition indicate pathological processes including several types of cancer. There are at least 14 different glycoprotein cancer biomarkers approved by the FDA, which can be applied in diagnostics. Current state-of-the-art glycoprofiling tool based on lectins in a fluorescent format of analysis offering detection limit down to nM level with a narrow linear range. We are focusing on analytical approaches, which can detect glycoproteins down to fM or aM level, what is million or billion times lower concentration compared to fluorescent lectin biosensors with a focus to detect clinically relevant biomarkers.



Ústav experimentálnej fyziky SAV

Riesiteľ: Martina Koneracká

Projekt:

Magnetic nanoparticles in liquid carrier (magnetic fluids)

The proposed project is devoted to the preparation and stabilization of magnetic nanoparticles in liquid carrier (so called magnetic fluids) and consequently modification with suitable biocompatible materials with the aim to use the biocompatible magnetic system for magnetic drug targeting, for example. The next application of magnetic nanoparticles is in energy systems i.e. magnetic fluids can serve as a cooling and insulating medium in a power transformers leading to more efficient and environmentally safer power transformers. The part of the project is complex characterization of prepared magnetic nanoparticles by the routine methods such as infrared spectroscopy, magnetic, rheological, thermal and electrical measurements, scanning electron microscopy, transition electron microscopy, dynamic light scattering and differential centrifugal sedimentation.



Ústav polymérov SAV

Riesiteľ: Ivan Chodák

Projekt:

Nanocomposites with polymeric matrix

If clays are applied as nanofillers precursors, surface modification is needed to modify its surface to be more hydrophobic. A procedure enabling to determine exact degree of hydrophobization for each particular polymer was developed. The procedure was proved also for several synthesized modifiers for clays. These non-commercial nanofillers were tested in various polymeric matrices.

The clay-surface modification is easy and can be performed on larger scale. Concerning the synthesis of a particular modifier, certain commercially available precursors can be used and modified in one step synthesis which might be economically feasible.



Ústav materiálov a mechaniky strojov SAV

Riesiteľ: Martin Balog

Projekt:

HITEMAL – ultra-fine grade Al –based alloy composites with nano-particles reinforcement

With the rising energy-saving concerns, it is in immediate need to build light-weight structural parts using high strength materials with expected service at elevated temperatures. Al alloys are widely used in the transportation industry due to their high specific strength. However, high strength Al alloys show a pronounced strength loss at relatively low temperatures (~ 150 °C) due to overaging. High quality fine Al powder produced by gas-atomization is now available in commercial quantities at an affordable price. Consolidation of such fine Al powder allows the fabrication of ultra-finegrained Al composites reinforced with nanometric Al_2O_3 dispersoids, which are a result of the fragmented thin (~ 2 nm) native oxide films on the Al powder. Such Al- Al_2O_3 composites, named “High Temperature Aluminium” (*HITEMAL*), possess superior tensile and creep performance and thermal stability at elevated temperatures (up to ~ 450 °C) due to the unique strengthening and stabilizing effects of the nanometric Al_2O_3 particles along the boundaries of the submicrometric Al grains. The quantity and distribution of such nanometric Al_2O_3 dispersoids largely dictate the mechanical properties of the composites. Parts made of *HITEMAL* are produced using relatively simple processing and at relatively low cost.