Target silica spheres for water purification

Inna Melnyk
Institute of Geotechnics of SAS, Slovak Republic

Current research unites the efforts of the scientists in the synthesis of tailored functionalized silica-based materials, physicochemical characterization of their surface binding properties with valuable experience of their implementation in ecology and nanomedicine. The proposed report is set up to mobilize synergy effects within development of silica materials with predetermined characteristics for successful solution of problems associated with water and soil remediation and public health. The purpose of the present research is to develop smart functional silica materials for water purification (from organic and inorganic pollutants). The specific choice of silica materials is explained by their structural rigidity, mechanical and thermal stabilities (provided by inorganic component) in addition to specificity and selectivity (attributed to organic component). Moreover, the usage of one-pot synthesis makes it possible to regulate the porosity and the nature of the surface layer of such materials to meet the requirements of each application. We used several approaches to regulate the sorptive capacity of materials produced during the synthesis: Regulation of matrix porosity, variation in the functional groups content, incorporation of extra groups with different properties. It was shown that the changes in the synthesis temperature can affect the morphology and zeta-potential of the obtained particles, the content of groups, and the adsorption properties. We studied the adsorption properties of the functionalized silica spheres in relation to copper (II) ions and organic dyes from aqueous solutions. Furthermore, antimicrobial performance of the amine-containing materials that were synthesized was also analysed.

Speaker Biography

Inna Melnyk received her phd in chemistry in 2003 from chuiko institute of surface chemistry, national academy of science of ukraine (kyiv, ukraine). She is a visiting researcher at Institute of Geotechnics of Sas (Kosice, Slovak republic). She has over 70 publications including 2 in journal of material chemistry, 1 in scientific reports, 2 in RSC advances, 1 in separation and purification technology, 1 in journal of colloid and interface science, 1 in progress in solid state chemistry, 4 in microporous and mesoporous materials, 1 in beilstein journal of nanotechnology, 1 in adsorption, 1 in applied surface science etc. Her scientific interests are silica spherical particles, magneto-sensitive adsorbents, surface chemistry, sol-gel techniques and heavy metals adsorption. She is a regular reviewer in reputable scientific journals of elsevier, springer and RCS publishers.

e: in.melnyk@gmail.com

Notes: