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Hierarchical nano- or bio-composites based on magnetic nanostructures

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It can be seen that from the last decade of previous century a vase number of investigations is dedicated to nanomaterials and their unusual properties. Recently, however researches went further and start to combine few nanostructures in one hierarchical formation. Among others biorelated nanocomposites become driving force for huge number and very promising investigations. For example combination of the magnetic nanostructure nanowires or nanoparticles with bioactive molecules leads to a novel hybrid system which combines properties of nanostructures and bioparticle in one spices. In such manner specific recognition or catalytic properties of biomaterials are convoluted with the attractive electronic, optical, magnetic and structural characteristics of magnetic spices. To obtain functional biocomposite, nanostructures should be properly characterized from the structural and magnetic point of view. In addition it should be modified in special manner at the surfaces what can be realized by bonding or adsorption of various linkage chemistries. The drawback is that practically each application needs its own surface characteristic and activity. Therefore functional compounds can be directly bonded with organic molecules or via interconnectors. The other option is non-covalent interactions with for example fatty acids or proteins. Different ligands -SH, -COOH, -OP, -CN with different affinity either to the modified surfaces or bioparticles can be obtained. The reason why magnetic nanostructures with especial emphasis on nanowires and nanoparticles are considered as a promising candidate of biocomposite constituents is their easily modulated magnetic properties, which gives access to the fast and easy manipulation tool via use of the external magnetic field. Structural and magnetic properties of the presented magnetic nanowires and composites will be discussed on base of result obtained by: XRD, TEM, IR and Mössbauer spectroscopy.

Biography

BeataKalska-Szostko has completed in 2000 herPh.D.in Materials Physics from Uppsala University, Sweden. Herfirst postdoctoral position (2001-2003) was at Free University Berlin in Experimental Physics group.At the moment she is working at Chemistry Department University of Białystok, Poland. She is the Director of The Center of Synthesis and Analysis BioNanoTechno University of Bialystok, Poland. She has published more than 70 papers in reputed journals and has been serving as a reviewer in many scientific journals.She has more than 90 presentations of the results on National and International Conferences. She was and still is involved in activity of few COST Actions.

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