



Contribution ID: 61

Type: Oral

Nanotechnologies in diagnostic and theranostic applications

Monday 2 May 2016 11:10 (10 minutes)

Nanomaterials based mainly on polymer nanostructures, magnetic nanoparticles and carbon nanoallotropes represent challenging solution in various diagnostic, therapeutic and theranostic applications [1-6]. The present contribution explores the use of superparamagnetic nanoparticles as contrast agents in MRI diagnostics and theranostics involving the results of clinical trials. Various types of polymer and magnetic carriers used in targeted drug delivery are compared in terms of the drug loading and drug release mechanisms. The possibilities of carbon nanostructures (nanodiamonds, carbon nanotubes, graphene derivatives, carbon dots) and their hybrids in photoluminescent imaging, combined magneto-fluorescent imaging and drug delivery are also summarized. The specific attention is focused on photoluminescent carbon dots, control of their optical properties, toxicity and biodistribution. Their use for selective cell labeling, photoacoustic imaging, photodynamic therapy and targeted drug delivery is analyzed taking into account their emission characteristics, surface chemistry and structural properties.

Summary

Nanomaterials based mainly on polymer nanostructures, magnetic nanoparticles and carbon nanoallotropes represent challenging solution in various diagnostic, therapeutic and theranostic applications [1-6]. The present contribution explores the use of superparamagnetic nanoparticles as contrast agents in MRI diagnostics and theranostics involving the results of clinical trials. Various types of polymer and magnetic carriers used in targeted drug delivery are compared in terms of the drug loading and drug release mechanisms. The possibilities of carbon nanostructures (nanodiamonds, carbon nanotubes, graphene derivatives, carbon dots) and their hybrids in photoluminescent imaging, combined magneto-fluorescent imaging and drug delivery are also summarized. The specific attention is focused on photoluminescent carbon dots, control of their optical properties, toxicity and biodistribution. Their use for selective cell labeling, photoacoustic imaging, photodynamic therapy and targeted drug delivery is analyzed taking into account their emission characteristics, surface chemistry and structural properties.

Author: Prof. R. ZBORIL, OLOMUK UNIV. (CZ) (Regional Centre of Advanced Technologies and Materials, Department of Physical Chemistry, Faculty of Science, PalackýUniversity Olomouc, Tř. 17. listopadu 12, 771 46 Olomouc, Czech Republic)

Presenter: Prof. R. ZBORIL, OLOMUK UNIV. (CZ) (Regional Centre of Advanced Technologies and Materials, Department of Physical Chemistry, Faculty of Science, PalackýUniversity Olomouc, Tř. 17. listopadu 12, 771 46 Olomouc, Czech Republic)

Session Classification: Theranostics