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Gerard Tobias

Institut de Ciència de Materials de Barcelona, Spain

Nanoengineered inorganic materials for biomedical imaging

In this talk we will review recent progress on nanoengineering of inorganic and carbon nanomaterials for tailored applications. Special emphasis is paid in the group to exploit the synergies of both types of materials by the preparation of nanohybrids with novel or enhanced properties for application in the biomedical field. We will see how the encapsulation of materials into carbon nanotubes (CNTs) allows ultrasensitive imaging and even mapping of subcellular organelles, whereas functionalization of the external walls allows targeting of cancer cells. We have also recently developed CNTs for dual imaging by radio-labelling iron oxide decorating the external surface of CNTs. The resulting hybrids allow SPECT and MRI imaging. Worth noting is the enhancement of the MRI signal by modification of the nanocarrier (non-MRI active) rather than the magnetic nanoparticles themselves. The encapsulation of materials also allows the formation of single-layered inorganic nanotubes. A large deal of attention is being devoted towards the isolation and growth of single layers of a wide variety of inorganic materials which is of interest for both fundamental research and advanced applications, so the present approach offers a new synthetic strategy for this type of materials.

Biography

Gerard Tobias obtained the Masters in Chemistry with Honours from the Autonomous University of Barcelona in 2000, Master in Materials Science and PhD with European Mention UAB, ICMAB in 2004. He was a Research Visitor at Ames Laboratory, USA and EMAT, Belgium. Between 2004-2009 he was at Oxford University, UK. Since 2009 he leads research on Nanoengineering of Carbon and Inorganic Materials at the Materials Science Institute of Barcelona, ICMAB-CSIC. He has been a member of the COST Action TD1004 on Theragnostics Imaging and Therapy; has coordinated the FP7 European network RADDEL and has been recently granted an ERC Consolidator Grant (NEST, 725743).

gerard.tobias@icmab.es

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