

AVVISO DI SEMINARIO

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Aula G

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Functional materials and nanostructures: synthesis and characterization at PAMSE-FBK

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Summary

Complex applications require the use of even more advanced materials. Among other diamond exhibit a long list of uncommon properties. In addition to hardness and high thermal conductivity useful for mechanical applications, diamond possesses high refractive index coupled to high transparency in a broad optical range. The wide potential window and the possibility to modulate its electronic properties changing the surface termination make diamond a very good candidate for the development of novel class of biosensors. A key factor is the ability to control the system structure and the surface properties to optimize the coupling with the analytes and increase the device sensitivity.

Besides diamond, there are other materials which exhibit a number of uncommon, interesting properties. They are nanostructured systems showing optical, electronic and magnetic properties not present in the bulk material. This renders the nanostructures very attractive for a wide range of applications. Among others, nanostructures are widely used in biomedicine for the study of genes and for the development of new class of drugs for the tumor care. In this case, nanostructures are used as drug carriers with specific functionalities allowing a better targeting of tumor tissue. In addition depending on the kind of material chosen, they allow intensification in magnetic resonance imaging or Raman spectra. Important in this respect is the possibility to integrate these system with microelectronics using spincasting, spray-coatings or electrodepositions.

For the development of a new system either on the macro and nanoscale, fundamental is the possibility to control step by step the synthesis and the effect of functionalization processes. Results of the research activity carried out at PAMSE-FBK concerning the development of bulk or nanostructured materials will be presented.