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### **Lanthanide Hybrid NanoParticles for diagnosis and therapy in oncology**

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Lanthanide Hybrid NanoParticles (LHNP) are constituted of sub 10 nm core of lanthanide oxide, coated by a polysiloxane Shell.

For a couple of decades, greater and greater connections have been made between nanotechnology, biology and medicine. Initially based on noble metals and semi-conductors, they now become more and more sophisticated with an increased possibility of highly sensitive detection, specific targeting, drug delivery triggering and combination on both diagnosis and therapy. In all cases, the nanometric size is a crucial parameter to confer to particles key properties as stealthiness or high colloidal stability with respect to the environment and of the external medium.

This conference will show how the development of nano-hybrids based on lanthanide oxides may consist of an interesting strategy to elaborate always more efficient probes in the domains of biological detection and imaging. These Multifunctional nanoparticles appear therefore very attractive since they are doubly luminescent, efficient as contrast agents for MRI and able to be functionalized by biotargeting groups. LHNP present also direct or indirect therapeutic properties : e.g. radio-sensibilising with increase of gamma or X-radiotherapy effect or neutron capture therapy with gadolinium HNP and brachytherapy with holmium, or lutetium.

The conference will show how in this context the development of a new kind of nano-hybrids based on rare-earth oxides opens a promising way in the field of both biology and medicine.