



UNIVERSITÀ DEGLI STUDI DI NAPOLI "FEDERICO II"

Dipartimento di Scienze Chimiche

Dottorato in Scienze Chimiche - XXXVI

***Ph.D. in Chemical Sciences
Cycle XXXVI***

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Research project title:

Design and characterization of metal/gel-based nanostructured composites.

Keywords: polysaccharides, inorganic nanoparticles, nanostructured systems, sensing.

Research project abstract:

The project aims to design and characterize nanostructured hydrogels formed by a thermo-responsive polymer (hydroxypropylcellulose derivatives) or a pH-sensitive polymer (a chitosan derivative, i.e. N-palmitoyl-chitosan) combined with amphiphilic-coated inorganic nanoparticles (Au, Pt, ZnO, Fe₃O₄). Hydrogel nanocomposites, i.e. hydrogels converged with nanomaterials, have been proposed for the functional implementation of conventional hydrogels. The incorporation of suitable nanomaterials into the hydrogel matrix allows the hydrogel nanocomposite to exhibit multi-functionality in addition to the biocompatible feature of the original hydrogel. In particular, the combination of the modular mechanical and biocompatibility properties of the gel with well-defined physico-chemical properties (such as optical, thermal, electrical, magnetic) typical of inorganic nanoparticles (NPs) can promote the interest in the development of hydrogels-based nanocomposites for electronic, electrochemical and biomedical devices. This strategy can also contribute to develop a new generation of flexible and extensible electrical/electrochemical devices with unconventional functions and performances.