

Fabio Carniato

Curriculum vitae

PERSONAL DATA

Date and place of birth: 13-09-1980, Alessandria – Italy

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BIO AND EDUCATION

Dr. Fabio Carniato graduated in applied chemistry with top mark (110/110 with laude) at the University of Eastern Piedmont in Alessandria (2004). He obtained in the same University the PhD degree in Chemistry in 2008, followed by the position of Research Assistant (2008-2013) and Researcher in October 2013 in the inorganic chemistry field. In 2014 he obtained the national qualification to become Associate Professor in Inorganic Chemistry (03/B1). Since 2009, he held different courses at the University of Eastern Piedmont and since 2013 is the holder of the course of General and Inorganic Chemistry and Laboratory for the Course of Materials Science.

Since 2004, F. Carniato has focused his studies on the synthesis of molecular organosilica compounds (POSS), layered materials with controlled chemical composition and ordered mesoporous silica. Large attention has been devoted to the functionalization of these materials with different molecular entities following several synthetic methodologies in order to obtain multifunctional solids of interest for several applications. More recently, F. Carniato has been involved in the preparation of innovative multifunctional hybrid materials bearing in the structure a combination of luminescent and paramagnetic chelates, drug or chemotherapeutic molecules to employ as diagnostic probes and drug carriers in preclinical therapy. The acquired experience in the synthesis and characterization of the hybrid organic/inorganic solids was important for the development of several research projects where F. Carniato was involved.

He is author of 67 original publications on international scientific journals (20 as first author and 3 as corresponding author), one Italian patent, one book chapter and numerous poster and oral communications in national and international Congresses.

UNIVERSITY CAREER

2013-	Researcher, Università del Piemonte Orientale (IT)
2008-2013	Research Assistant, Università del Piemonte Orientale (IT)
2006-2007	Contract, Centro di Cultura per l'Ingegneria delle Materie Plastiche, Alessandria (IT)
2006	Contract, Università degli Studi di Torino (IT)

MAIN FIELDS OF INTEREST

1. Inorganic-organic hybrid materials
2. Paramagnetic nanoparticles
3. Diagnostic probes
4. Coordination chemistry
5. Luminescent materials

CURRENT ISSUES OF RESEARCH

- 1. Synthesis and characterization of multifunctional inorganic nanoparticles with paramagnetic and luminescent properties**

New co-precipitation and solvothermal synthetic procedures will be optimized to prepare stable inorganic metal oxide and lanthanide fluoride nanoparticles with particles size below 10 nm. The solids will be tested as promising probes for MRI, optical imaging and X-ray computed tomography diagnostic procedures and characterized through relaxometric and spectroscopic analyses.

- 2. Preparation of porous and layered materials for diagnostic applications**

The research activity will be focused on the implementation of sol-gel and hydrothermal synthetic procedures required to obtain mesoporous silica and layered materials with controlled chemical composition. Macrocyclic Gd³⁺-chelates will be anchored on the external surface of silica nanoparticles or confined through ionic exchange procedures in the interlayer space of synthetic clays. The final materials will be characterized by the magnetic point of view and explored as potential MRI probes.

- 3. Synthesis of functionalized mesoporous silica for theranostic applications**

In the last decade, mesoporous silica NPs attracted growing interest in the biomedical field. This was mainly due to their properties in terms of high specific surface area, tunable porosity and high chemical reactivity. Porous silica are able to host in the same particle different species, such as diagnostic probes, drugs and targeting molecules. The combination of these functionalities make NPs good candidate for theranostic applications. Therefore, the research activity will be focused on the development of new optimized multifunctional silica with high biocompatibility for pre-clinical applications.

CURRENT FUNDED PROJECTS

PROGRAMME	FUNDED PROJECT
Programme Ateneo-CSP 2014	THERASIL – “TAILORING THE MAGNETIC PROPERTIES OF MESOPOROUS SILICA NANOPARTICLES FOR THERANOSTIC APPLICATIONS” COORDINATOR: PROF. LORENZO TEI

TOP FIVE PAPERS

1. Y. Li, Y. Huang, Z. Wang, F. Carniato, Y. Xie, J.P. Patterson, M.P. Thompson, C.M. Andolina, T.B. Ditri, J.E. Millstone, J.S. Figueroa, J.D. Rinehart, M. Scadeng, M. Botta, N.C. Gianneschi, “Polycatechol Nanoparticle MRI Contrast Agents”, *Small*, **2016**, vol. 12, Issue 5, 668–677, doi 10.1002/smll.201502754
2. F. Carniato, C. Bisio, R. Psaro, L. Marchese, M. Guidotti, “Nb(V)-saponite clay for the catalytic oxidative abatement of chemical warfare agents”, *Angewandte Chemie International Edition*, **2014**, vol. 53, Issue 38, 10095-10098, doi 10.1002/anie.201405134.
3. F. Carniato, L. Tei, A. Arrais, L. Marchese and M. Botta, “Selective anchoring of GdIII-chelates on the external surface of organo-modified mesoporous silica nanoparticles: a new chemical strategy to enhance relaxivity”, *Chemistry-A European Journal*, **2013**, vol. 19, 1421-1428, dx.doi.org/10.1002/chem.201202670
4. F. Carniato, L. Tei, W. Dastrù, L. Marchese and M. Botta, “Relaxivity modulation in Gd-functionalised mesoporous silicas.” *Chemical Communications*, **2009**, 1246-1248, doi: 10.1039/b820591d.
5. F. Carniato, C. Bisio, G. Gatti, E. Boccaleri, L. Bertinetti, S Coluccia, O. Monticelli and L. Marchese, “Titanosilsesquioxanes Embedded in Synthetic Clay as a Hybrid Material for Polymer Science.” *Angewandte Chemie International Edition*, **2009**, vol. 48, 6059-6061, doi: 10.1002/anie.200901927 (VIP).

AWARDS

1. Co-Tutor of Degree Thesis in Chemical Sciences, University of Eastern Piedmont, winner of “Premio Della Casa”, 2013.
2. Young Researcher of University of Eastern Piedmont with the highest impact factor in the scientific field in 2012-2013.