# LEONARDO MARCHESE

Leonardo Marchese was born in Italy (Stigliano, MT) on 01.08.1960. He graduated with top mark (110/110 with laude) at the University of Turin on July, 1985 and obtained, in the same University, the PhD degree in Chemistry (September 1990), followed by the positions of Research Assistant (February 1992), Researcher (November 1994) and Associate Professor (November 1998). Since 2005, he is Full Professor in Physical Chemistry at the Faculty of Science MFN of the "Università del Piemonte Orientale "Amedeo Avogadro"- Alessandria, Novara, Vercelli".

Since his PhD, L. Marchese has been studying morphology and reactivity of the surfaces of microcrystalline materials by means of optical spectroscopies (FTIR, Diffuse Reflectance UV-Vis and Photoluminescence), High Resolution Transmission Electron Microscopy (HRTEM) and Scanning Electron Microscopy (SEM) and by volumetric and thermogravimetric techniques. Both simple oxides (MgO, $Al_2O_3$, $SiO_2$, $TiO_2$, etc.) and metal supported on oxides (Ni/MgO, Pt/$Al_2O_3$, etc.) have been studied.

L. Marchese worked for 18 months in the 1992-1994 period at the Royal Institution of Great Britain in London with Prof. sir J.M. Thomas on the determination of local structure and catalytic properties of acid and redox centres of microporous aluminophosphate and aluminosilicate-based zeolitic materials. These studies, published on "Science" and "Angew. Chem.", were performed by combining infrared, x-rays absorption and diffraction techniques and solid state NMR.

Since 1994, L. Marchese has started a research activity, unique at national level, on the hydrothermal synthesis of both novel microporous aluminophosphates containing silicon ions and/or transition metal ions and novel mesoporous silicas functionalised with transition metal ions. These materials have displayed very interesting catalytic activity (especially high selectivity) in the oxidative dehydrogenation of alkanes (ethane and propane) and in the conversion of methanol to light olefins (MTO process). High performance in cracking reactions have been also obtained on innovative nanostructured micro and mesoporous aluminosilicate with acid properties. This discovery has been covered by a US patent.

In the last years, he expanded his interests in the development of innovative layered or porous inorganic and organic/inorganic hybrids and multifunctional polyhedral silsesquioxanes (POSS), which have been used in several applications as: i) polymeric composite materials with enhanced flame retardant properties; ii) acid and/or redox catalysts for sustainable chemistry; iii) light emitting materials for optoelectronics; iv) magnetic materials for biomedicine. These research activities have been published on high impact factor journals, including, Angew. Chem., Chem. Commun., Chem. Phys. Phys. Chem., Langmuir, J. Phys. Chem., Chem. Eur. J., Chem. Mat. J. Mater. Chem., Green Chem.. One of the most recent work on innovative hybrid inorganic-organic materials has been published on Angew. Chem. as VIP (Very important Paper) article. L. Marchese has been Guest Editor of two themed issues of J. Mater. Chem. and Microporous and Mesoporous Materials dedicated to layered materials and their applications in Catalysis and Nanotechnology.

L. Marchese has been Responsible of research units in the following projects:

- PRIN2002 of the Italian MIUR (title: Advanced polymer hybrids and nanocomposites with low environmental impact"; national coordinator Prof. G. Camino);

- FIRB of the Italian MIUR (title: "Basic and Functional aspects of Nanostructured Inorganic-Organic Hybrid Polymeric Materials " (2003-2007); national coordinator Prof. G. Camino);

- FISR of the Italian MIUR (title: "Matrici di Microcombustori ad Idrogeno" (2004-2008), national coordinator Dr. P. Perlo, Centro Ricerche Fiat);

- STREP of the VI European FP (title: "Environmentally friendly multifunctional fire retardant polymer hybrids and nanocomposite" (2005-2008); European leader Prof. G. Camino);

He is (or has been) Coordinator of:

- European STREP project of the VI FP titled: "Novel Inorganic Nanostructured Materials and Devices with Enhanced Photoemission Activity and Thermal Stability" (2005-2008),

STABILIGHT; among others, Fiat Research Centre and Nanoscience Centre of the University of Cambridge are involved in this project;

- European Project of the VII FP (joint call NMP-ENERGY) titled "Innovative Materials for Future Generation Excitonic Solar Cells" (2009-2011), INNOVASOL; among others, Fiat Research Centre, Nanoscience Centre of the University of Cambridge (Prof. M. Welland) and Laboratory of Photonic and Interfaces of the Ecole Polytechnique of Lausanne (Prof. M. Graetzel) are involved in this project.

- Regional Project (CIPE) titled "Novel Nanostructured Materials for Light Emitting Devices and Application to Automotive Displays" (2007-2010), NANOLED, involving Magneti Marelli;

- PRIN of the Italian MIUR titled "Progettazione e sintesi di Silsesquiossani Poliedrici Multifunzionali per Compositi Polimerici Innovativi Termicamente Stabili"(2007-2009);

- MIUR Project of "Internazionalizzazione" titled "Sviluppo di materiali innovativi micro e mesoporosi: materiali inorganici lamellari e porosi per la catalisi e per nanocomposti polimerici" (2005-2008) with the University of Campinas (Brazil);

The research activities in the field of Nanoscience and Nanotechnology have allowed the constitution in the Università del Piemonte Orientale of an Interdisciplinary Centre, Nano-SiSTeMI, where the most advanced, top level equipments are present included a very recent solid state NMR spectrometer.

L. Marchese covers the following Academic positions:

- Director of the Department of Science and Advanced Technology of the Università del Piemonte Orientale;

- Director of the Master Course of "Materials for Energy and Environment";

- Representative of the University of Eastern Piedmont in the scientific board of PROPLAST a consortium of 15 Italian Universities and over 150 small and medium enterprises and multinational companies involved in the research/production of plastic materials.

- Coordinator of the Interdisciplinary Centre, Nano-SiSTeMI, which includes over 40 young and senior researchers.

He has authored 165 original publications on international scientific journals and 2 international patents.