



Maria Paola Carpanese

Fixed-term assistant professor

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Education and training

2008

PhD in Materials Science and Technology

Electrochemical Investigation of Composite Cathodes for SOFCs
Experimental and Theoretical Study.

University of Genova - Genova

2003

Master degree in Chemical Engineering

STUDY OF ELECTROCHEMICAL KINETICS OF COMPOSITE ELECTRODES FOR
SOFC DEVICES - 106/110

University of Genova - Genova

Academic experience

2015 - 2018

Fixed-term researcher

University of Genova - Genova

Research in the field of production and characterisation of SOFC / SOEC
devices. Teaching activity

2008 - 2015

Post-doctoral fellow

University of Genova - Genova

Optimisation activity on ceramic layers optimisation of the experimental
procedures for the acquisition of impedance spectra teaching activity

Language skills

English

Independent

Teaching activity

A.Y. 2017-2018:

- Teaching activity for the official teaching of 'Ceramic Materials' (Code 65943, SSD ING-IND / 22 - MATERIALS SCIENCE AND TECHNOLOGY, Co-teacher Prof. Rodolfo Botter). Total 10 hours, I semester.
- Teaching activity for the official teaching of Chemistry Complements

(Code 60282, SSD CHIM / 07 - CHEMICAL FOUNDATIONS OF TECHNOLOGIES, Co-teacher Prof. Marina Delucchi). Total 24 hours, II semester.

- Teaching activity for the official teaching of 'General and applied chemistry' (Code 72686, SSD CHIM / 07 - CHEMICAL FOUNDATIONS OF TECHNOLOGIES, Co-teacher Prof. Antonio Barbucci). Total 30 hours, I and II semester.

A.Y. 2016-2017:

- Teaching activity for the official teachings of 'Ceramic Materials' (Code 65943, SSD ING-IND / 22 - SCIENCE AND TECHNOLOGY OF MATERIALS, Co-teacher Prof. Rodolfo Botter). Total 10 hours, I semester.
- Teaching activity for the official teaching of Chemistry Complements (Code 60282, SSD CHIM / 07 - CHEMICAL FOUNDATIONS OF TECHNOLOGIES, co-teacher Prof. Marina Delucchi). Total 24 hours, II semester.

A.Y. 2015-2016:

- Teaching activity for the official teachings of 'Ceramic Materials' (Code 65943, SSD ING-IND / 22 - SCIENCE AND TECHNOLOGY OF MATERIALS, co-teacher Prof. Rodolfo Botter). Total 10 hours, I semester.
- Teaching activity for the official teaching of Chemistry Complements (Code 60282, SSD CHIM / 07 - CHEMICAL FOUNDATIONS OF TECHNOLOGIES, co-teacher Prof. Giacomo Cerisola). Total 24 hours, II semester.

A.Y. 2014-2015:

Supplementary teaching activity (Article 23, paragraph 2, Law 240/2010) of the official teaching of 'Ceramic Materials' (Code 65943, owner of the course: Prof. Rodolfo Botter), entitled 'Conducting mechanisms and ceramic materials for fuel cells ', for a total of 6 hours, I semester.

A.Y. 2011-2012:

Supplementary teaching activity (Article 23, paragraph 2, Law 240/2010) of the official teaching of 'Corrosion and Protection of Materials' (Code 65969, Course owner: Prof. Giacomo Cerisola), entitled 'Electrochemical techniques of Corrosion monitoring ', for a total of 15 hours, II semester.

A.Y. 2007-2008:

- Tutoring and didactic-integrative, introductory and recovery activities within the ING03 project, at the Faculty of Engineering of the University of Genoa, for a total of 49 hours.
- Supplementary didactic activity (Art. 32, V comma) of the official teaching of 'Chemistry I' (Code 18615, Mechanical Engineering, owner of the course: Prof. Antonio Barbucci), entitled 'Chemical reactions and quantitative relationships'.

A.Y. 2006-2007:

Teaching support activities (Art. 33) for the Chemistry I course, degree course in Mechanical Engineering and Electrical Engineering (owner of the course: Prof. Paolo Nanni), for a total of 40 hours.

A.Y. 2005-2006:

- Teaching support activities (Article 33) for the Chemistry I Course, Degree Course in Chemical and Naval Engineering (Code 186144, owner of the Course: Prof. Antonio Barbucci), for a total of 20 hours.
- Teaching support activities (Article 33) for the Chemistry I Course, Degree Course in Mechanical Engineering and Electrical Engineering (owner of the Course: Prof. Paolo Nanni), for a total of 40 hours.

Postgraduate research and teaching activity

Postgraduate (PhD) teaching activity

Sole teacher of the official course 'Electrochemistry principles and applications', for the Ph.D. in Civil, Chemical and Environmental Engineering. Curriculum of Chemical Engineering, Materials and Process, 3 CFU (15 hours), at the University of Genoa.

Research interests

- Synthesis of ceramic powders and fabrication of functional layers for ionic and proton conducting solid oxide fuel cells and electrolyzers; SOFC / SOEC reversible cell systems.
- Use of impedance spectroscopy and other electrochemical techniques: investigation of the electrochemical behavior and of the kinetic mechanisms of the cathodic and anodic reactions. Conductivity study of functional ceramics.
- Characterization of new materials and investigations of different methods (tape-casting, infiltration, wet powder spraying) for the optimization of the electrochemical performances and of the chemical / microstructural stability of the cell components;
- Impedance spectroscopy: optimization of the experimental procedures for the acquisition of impedance spectra; spectra analysis by (i) Complex Nonlinear Least Squares (CNLS)-fit routine, (ii) distribution of relaxation times, (iii) analysis through theoretical models.
- Study of storage of hydrogen in metal hydrides and its regeneration
- Applications of electrochemical techniques for water purification:
 - electrochemical removal of pollutants through the use of different types of electrodes (boron-doped diamond, PbO₂e TiRuSnO₂ anodes);
 - degradation of surfactants by Electro-Fenton process.

Assignments abroad

From 01.10.2018 to 31.10.2018

Invited researcher (one month). Laboratoire Interdisciplinaire Carnot de Bourgogne, UMR 6303 CNRS / Université de Bourgogne, Dijon, France.

Research topic: 'Preparation of solid oxide fuel cell samples and impedance spectroscopy characterization'. Scientific responsible: Prof. Gilles Caboche.

06/23/2017

Seminar by invitation, entitled: 'Research activity for performance optimization and durability improvement of solid oxide cell systems at MErgELab'. Laboratoire Interdisciplinaire Carnot de Bourgogne, UMR 6303 CNRS / Université de Bourgogne, Dijon, France.

From 15.05.2017 to 05.08.2017

Invited researcher (three months). Laboratoire Interdisciplinaire Carnot de Bourgogne, UMR 6303 CNRS / Université de Bourgogne, Dijon, France.

Research topic: 'Preparation of solid oxide fuel cells through the co-tape casting technique'. Scientific responsible: Prof. Gilles Caboche.

From 01.11.2007 to 01.12.2007

Research scholar (one month). Institute of Electrochemistry and Energy Systems (CLEPS), Center of Excellence, Bulgarian Academy of Sciences, Sofia, Bulgaria. Research topic: 'Application of Differential Impedance Analysis (DIA) to Experimental Impedance Data obtained from SOFC cathodes'. Scientific responsible: Prof. Zdravko Stoyanov.

From 1.06.2005 to 30.09.2005

Research scholar (four months). Group of Electrochemical Engineering, Ecole Polytechnique Federal de Lausanne, Lausanne, Switzerland. Research topic: 'Impedance spectroscopy investigation on anode-supported and electrolyte-supported solid oxide fuel cells'. Scientific responsible: Prof. Christos Comninellis.

From 01.02.2005 to 28.02.2005

Research scholar (one month). Institute of Electrochemistry and Energy Systems (CLEPS), Center of Excellence, Bulgarian Academy of Sciences, Sofia (Bulgaria). Research topic: 'Training course on Differential Impedance Analysis (DIA) and Data Formatting for VRIMS (Virtual Research Information Management System)'. Scientific coordinators: Prof. Zdravko Stoyanov and Prof. Daria Vladikova.

Other professional activities

From 20.02.2006 to 15.03.2006

Assignment of work, National Interuniversity Consortium for Materials Science and Technology (INSTM). Theme: 'Preparation of anode for fuel cells with supporting anode and application'.

From 01.02.2009 to 31.03.2009

Assignment of work, CNR-IENI, UOS of Genoa (Prot. N. 0000092 of 28.01.2009). Theme: "Development of innovative architectures for solid oxide fuel cells. Configuration of electrical connections and gas lines for modular stacks. Realization of three-dimensional design models and operational drawings".