

Personal information

Name | Monica Pica
Date of Birth | 26-09-1974
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Position

2010- present | Assistant professor of the Department of Pharmaceutical Sciences
SSD CHIM/03

Education

PhD degree in Chemical Sciences | Got in 2003 at University of Perugia. Thesis title: "Composite membranes for fuel cells containing layered zirconium phosphonates". Supervisors: Prof. Giulio Alberti, Prof. Mario Casciola
Degree in Chemistry | Got in 2000 cum laude at University of Perugia. Thesis title: "Reactivity of ions and ion-pairs in the nucleophilic substitution reaction of meta- and para-benzensulfonates". Supervisors: Prof. Sergio Alunni, Prof. Gustavo Reichenbach
High School Degree | Got in 1993 at Liceo Scientifico Statale "Raffaele Casimiri", Gualdo Tadino, Perugia (IT)

Research activity

Development of new synthetic procedures of layered inorgano-organic functional materials based on M(IV) phosphate/phosphonates and their use for the following applications:

- polymer nanocomposites;
- proton conducting composite membranes for electrochemical devices for energy storage and conversion;
- heterogeneous catalyst supports based on (a) silver@silver halide heterojunctions for photocatalytic reactions, (b) nanoparticles of noble metals such as Au, Pd, for organic reactions and CO PROX.

Teaching activity

A.A. 2014-2015 | - General and Inorganic Chemistry– *Lectures of inorganic chemistry* (Degree in Pharmaceutical Chemistry and Technology), Department of Pharmaceutical Sciences.
A.A. 2013-2014 | - General and Inorganic Chemistry– *Lectures of inorganic chemistry* (Degree in Pharmaceutical Chemistry and Technology), Faculty of Pharmacy of Perugia University.
- General and Inorganic Chemistry– *Lectures of general chemistry* (Degree in Pharmaceutical Chemistry and Technology), Faculty of Pharmacy of Perugia University.
A.A. 2012-2013 | PhD Lecture, Department of Chemistry of Perugia University. Title: *Polymer nanocomposites: from fundamental research to specific applications*.
A.A. 2011-2012 | - General and Inorganic Chemistry– *Lectures of general chemistry* (Degree in Pharmaceutical Chemistry and Technology), Faculty of Pharmacy of Perugia University.
- General and Inorganic Chemistry– *Lectures of general chemistry* (Degree in Pharmaceutical Chemistry and Technology), Faculty of Pharmacy of Perugia University.
A.A. 2010-2011 | - Inorganic and Analytical Chemistry (Degree in Pharmacy), Faculty of Pharmacy of Perugia University.
Other activities | Supervisor of experimental thesis for: Degree in Pharmaceutical Chemistry and Technology (Department of Pharmaceutical Sciences), Degree in Chemistry and PhD Degree in Chemical Sciences (Department of Chemistry, Biology and Biotechnologies).

Research Projects

2010-2013 | Collaborative European Project FCH-JU MAESTRO (MembrAnEs for STationary application with RObust mechanical properties, project number 256647, VII PF)
2011-2012 | "Galileo" Scientific Cooperation Programme between Italy and France (project number 26042ZB) funded by Università Italo-Francese. French partner: CNRS –University of Montpellier II- Institute Charles Gerhardt– ICGM, Montpellier (Prof. D.J. Jones)
Collaboration with Novamont within the Project, funded by MIUR: "Studio, sperimentazione e realizzazione di innovativi nano compositi plastici biodegradabili a base di olio vegetale e amido nano strutturato con proprietà meccaniche e funzionali programmate, per la realizzazione di imballaggi ultrasottili".
2010-2011

Selected publications

- 1) Immobilized palladium nanoparticles on potassium zirconium phosphate as an efficient recoverable heterogeneous catalyst for a clean Heck reaction in flow, C. Petrucci, M. Cappelletti, O. Piermatti, M. Nocchetti, M. Pica, F. Pizzo, L. Vaccaro, *Journal of Molecular Catalysis A: Chemical*, doi:10.1016/j.molcata.2015.02.012
- 2) Nanosized zirconium phosphate/AgCl composite materials: a new synergy for efficient photocatalytic degradation of organic dye pollutants, M. Pica, M. Nocchetti, B. Ridolfi, A. Donnadio, F. Costantino, P. L. Gentili, M. Casciola, *Journal of Materials Chemistry A*, 2015, **3**, 5525 - 5534
- 3) Zirconium phosphate reinforced short side chain perfluorosulfonic acid membranes for medium temperature proton exchange membrane fuel cell application, M. Casciola, P. Cojocar, A. Donnadio, S. Giancola, L. Merlo, Y. Nedellec, M. Pica, S. Subianto, *Journal of Power Sources*, 262, 2014, 407-413.
- 4) Layered zirconium alkylphosphates: Suitable materials for novel PFSA composite membranes with improved proton conductivity and mechanical stability, A. Donnadio, M. Pica, D. Capitani, V. Bianchi, M. Casciola, *Journal of Membrane Science*, 462, 2014, 42-49.
- 5) Reactive coaxial electrospinning of ZrP/ZrO₂ nanofibres, S. Subianto, A. Donnadio, S. Cavaliere, M. Pica, M. Casciola, D. J. Jones and J. Rozière, *J. Mater. Chem. A*, 2014, **2**, 13359-13365.
- 6) Dynamic nuclear polarisation NMR of nanosized zirconium phosphate polymer fillers, F. Ziarelli, M. Casciola, M. Pica, A. Donnadio, F. Aussenac, C. Sauvé, D. Capitani, S. Viel, *Chem. Commun.*, 2014, **50**, 10137-10139
- 7) Promising Aquivion Composite Membranes based on Fluoroalkyl Zirconium Phosphate for Fuel Cell Applications, A. Donnadio, M. Pica, S. Subianto, D. J. Jones, P. Cojocar, M. Casciola, *ChemSusChem*, 2014, **7**, 2176–2184.
- 8) Layered Metal(IV) Phosphonates with Rigid Pendant Groups: New Synthetic Approaches to Nanosized Zirconium Phosphate Phenylphosphonates, M. Pica, A. Donnadio, R. D'Amato, D. Capitani, M. Taddei, M. Casciola, *Inorganic Chemistry* **2014** 53 (4), 2222-222.
- 9) Aminoalcohol functionalized zirconium phosphate as versatile filler for starch-based composite membranes, M. Pica, A. Donnadio, V. Bianchi, S. Fop, M. Casciola, *Carbohydrate Polymers* 2013, **97**, 210.
- 10) Looking for New Hybrid Polymer Fillers: Synthesis of Nanosized α -Type Zr(IV) Organophosphonates through an Unconventional Topotactic Anion Exchange Reaction, M. Pica, A. Donnadio, Elisabetta Troni, Donatella Capitani, M. Casciola, *Inorg. Chem.* 2013, **52**, 7680.
- 11) Physical and chemical modification routes leading to improved mechanical properties of perfluorosulfonic acid membranes for PEM fuel cells, S. Subianto, M. Pica, M. Casciola, P. Cojocar, L. Merlo, G. Hards, D. J. Jones, *Journal of Power Sources* 2013, **233**, 216.
- 12) Design and synthesis of plasticizing fillers based on zirconium phosphonates for glycerol-free composite starch films, A. Donnadio, M. Pica, M. Taddei, R. Vivani, *J. Mater. Chem.*, 2012, **22**, 5098.
- 13) Starch/zirconium phosphate composite films: Hydration, thermal stability, and mechanical properties, M. Pica, A. Donnadio, M. Casciola, *Starch/Stärke* 2012, **64**, 237.
- 14) Short side chain perfluorosulfonic acid membranes and their composites with nanosized zirconium phosphate: hydration, mechanical properties and proton conductivity, M. Pica, A. Donnadio, M. Casciola, P. Cojocar, L. Merlo, *J. Mater. Chem.*, 2012, **22**, 24902.
- 15) Advances in the Chemistry of Nanosized Zirconium Phosphates: A New Mild and Quick Route to the Synthesis of Nanocrystals, M. Pica, A. Donnadio, Donatella Capitani, Riccardo Vivani, Elisabetta Troni, M. Casciola, *Inorg. Chem.* 2011, **50**, 11623.

Other activities

2015

Lead Guest Editor of the Special Issue "Recent Advances in Ionomeric Membranes for Energy-Related Applications" of *Journal of Chemistry* (Hindawi Publishing Corporation), within the Materials Chemistry subject area.

<http://www.hindawi.com/journals/jchem/si/451216/cfp/>