

Informazioni Personali Riccardo Vivani

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Date of birth 10/02/1962 | **Nationality** Italian

Position Associate Professor
Academic Discipline CHEM-03/A - General and Inorganic Chemistry
Competition Sector 03/B1
University of Perugia, Department of Pharmaceutical Sciences, Via del Liceo 1,
06123 Perugia.

Professional Experience **Teaching Activities**

Lecturer in 'Analytical Chemistry' for Pharmaceutical Chemistry and Technology from 1995 to 2021;

Lecturer in 'General and Inorganic Chemistry' for Pharmacy from 2008 to present,

Lecturer in 'Inorganic and Analytical Chemistry' for Pharmacy from 2009 to 2017,

Lecturer in 'Solid State Chemistry' for Chemistry from 2021 to present.

Research Activity

His research activity between 1990 and 2026 is documented by over 140 articles in international journals and more than a hundred papers presented at national and international conferences; he is a co-author of six industrial invention patents and a co-author of a chapter in a book published by the Royal Society of Chemistry on topics related to his research.

His research focuses primarily on the inorganic chemistry of materials, with particular reference to:

- zirconium phosphates and phosphonates;
- lamellar and nanostructured materials;
- solid-state chemistry;
- mechanochemical synthesis of inorganic materials;
- structural characterisation by powder X-ray diffraction;
- solid-state FTIR and NMR spectroscopy;
- functional materials for catalysis, proton conduction and energy applications;
- Metal–Organic Frameworks (MOFs);
- diffractometric characterisation of pigments.

The scientific activity is characterised by an integrated approach combining synthesis, structural characterisation and the study of the functional properties of advanced inorganic materials.

Research areas for the period 2020–2026**1. Zirconium-based layered materials**

Development of new zirconium phosphates and phosphonates with layered structures, aimed at producing functional materials for catalytic, energy and

biomedical applications.

2. Sustainable synthesis of inorganic materials

Development of solvent-free mechanochemical procedures for the preparation of zirconium phosphates with high structural purity and microstructural control.

3. Advanced structural characterisation

Application of diffraction and spectroscopic techniques for the structural determination of polycrystalline and nanostructured materials.

4. Functional materials for catalysis and energy processes

Study of inorganic and hybrid materials for catalytic processes, electrochemical water oxidation and applications in the energy sector.

5. Diffractometric characterisation of the properties and alteration products of polychrome surfaces and pictorial matrices

Professional skills

- Good knowledge of synthesis techniques for inorganic and organo-inorganic materials.
- Good knowledge of techniques for characterising solid-state materials, such as thermogravimetry, thermal analysis (DTA, DSC), analysis of surface properties and porosity via gas adsorption, and infrared spectroscopy.
- Good knowledge of the main methods of qualitative and quantitative elemental chemical analysis, both classical and instrumental (AA, ICP-OES, NMR).
- Good knowledge of X-ray diffraction techniques for polycrystalline materials: determination and refinement of lattice parameters; ab initio crystallographic structure determination; structural refinement using the Rietveld method; determination of microstructural parameters (size and strain); qualitative and quantitative analysis of crystalline phases and quantitative estimation of the amorphous fraction.

Publications from the last 5 years

Fastelli, M.; Valentini, L.; Vivani, R.; Nocchetti, M.; Donnadio, A.; Di Michele, A.; Ricci, L.; Mortaro, F.; Zucchini, A.; Comodi, P., Effect of nano MgAl-NO₃ and MgAl-HCOO layered double hydroxides on early hydration kinetics and chloride binding in cement paste, MATERIALS AND STRUCTURES, 2026, 59, DOI: 10.1617/s11527-026-03130-4

Carboni Marri, Sara; Monico, Letizia; Rosi, Francesca; Miliani, Costanza; Vivani, Riccardo; Janssens, Koen; De Meyer, Steven; Mathon, Olivier; Cotte, Marine; Burghammer, Manfred; Garrevoet, Jan; Falkenberg, Gerald; Avranovich Clerici, Ermanno; Rios-Casier, Annelies; Van Der Snickt, Geert; Romani, Aldo, Discovering the dual degradation pathway of emerald green in oil paints: The effects of light and humidity, SCIENCE ADVANCES, 2025, 11, 1-11, DOI: 10.1126/sciadv.ady1807

Vivani, R.; Trovarelli, L.; Notari, M. S.; Paul, G.; Gatti, G.; De Paolis, E.; Pica, M., Structural and Microstructural Characterization of Zirconium Phosphates Prepared by Mechanochemical Synthesis, JOURNAL OF PHYSICAL CHEMISTRY. C, 2025, 129, 15480-15487, DOI: 10.1021/acs.jpcc.5c05049

Moretti, Patrizia; Russo, Giulia; Monico, Letizia; Vivani, Riccardo; Matteini, Mauro; Piqué, Francesca, Characterization of the reconversion products of darkened lead white and development of an innovative approach for its stabilization, THE EUROPEAN PHYSICAL JOURNAL PLUS, 2025, 140, 1-12, DOI: 10.1140/epjp/s13360-025-06334-9

Perna, Gabriele; Donnadio, Anna; Di Michele, Alessandro; Vivani, Riccardo; Fastelli, Maximiliano; Caglioti, Concetta; Cottone, Francesco, Bio-Based Piezoelectrets from Polylactic Acid and Natural Waxes: A Sustainable Approach for Energy Harvesting,

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Falletta, Ermelinda; Donnadio, Anna; Mila, Nikoletta; Haghshenas, Niloofar; Fabbrizio, Vincenzo; Vivani, Riccardo; Giordana, Alessia; Perna, Gabriele; Cottone, Francesco; Michele, Alessandro Di; Bianchi, Claudia L., Ultrasound-assisted synthesis of strontium-bismuth titanate and its application in environmental remediation, *ULTRASONICS SONOCHEMISTRY*, 2025, 118, DOI: 10.1016/j.ultsonch.2025.107380

Di Michele, A.; Sassi, P.; Vivani, R.; Minguzzi, A.; Prati, L.; Pirola, C., Role of the Solvent and Ultrasound Irradiation in the Preparation of TiO₂ for the Photocatalytic Degradation of Sulfamethoxazole in Water, *CATALYSTS*, 2024, 14, 910 DOI: 10.3390/catal14120910

Grainca, A.; Boccalon, E.; Nocchetti, M.; Vivani, R.; Di Michele, A.; Longhi, M.; Pirola, C., Sonochemical and mechanochemical synthesis of iron-based nano-hydroxalcalites promoted with Cu and K as catalysts for CO and CO₂ Fischer-Tropsch synthesis, *FUEL*, 2024, 373, DOI: 10.1016/j.fuel.2024.132303

DI MICHELE, Alessandro; Sassi, Paola; Vivani, Riccardo; Minguzzi, Alessandro; Prati, Laura; Pirola, Carlo, Role of the Solvent and Ultrasound Irradiation in the Preparation of TiO₂ for the Photocatalytic Degradation of Sulfamethoxazole in Water, *CATALYSTS*, 2024, 14, DOI: 10.3390/catal14120910

Di Michele, Alessandro; Boccalon, Elisa; Costantino, Ferdinando; Bastianini, Maria; Vivani, Riccardo; Nocchetti, Morena, Insight into the synthesis of LDH using the urea method: morphology and intercalated anion control, *DALTON TRANSACTIONS*, 2024, 53, 12543-12553, DOI: 10.1039/d4dt01529k

Clementi, Catia; Luzi, Francesca; Dominici, Franco; Marmottini, Fabio; Vivani, Riccardo; Latterini, Loredana; Puglia, Debora, Development of MOF-Pigment Hybrids to Implement a Sustainable Coloration of Poly(ϵ -caprolactone) Composites, *ACS SUSTAINABLE CHEMISTRY & ENGINEERING*, 2024, 12, 12525-12533, DOI: 10.1021/acssuschemeng.4c03884

Baldinelli, Lorenzo; Rodriguez, Gabriel Menendez; D'Ambrosio, Iolanda; Grigoras, Amalia Malina; Vivani, Riccardo; Latterini, Loredana; Macchioni, Alceo; De Angelis, Filippo; Bistoni, Giovanni, Harnessing the electronic structure of active metals to lower the overpotential of the electrocatalytic oxygen evolution reaction, *CHEMICAL SCIENCE*, 2024, 15, 1348-1363, DOI: 10.1039/d3sc05891c

Costantino, Claudio; Monico, Letizia; Rosi, Francesca; Vivani, Riccardo; Romani, Aldo; Colocho Hurtarte, Luis Carlos; Villalobos-Portillo, Eduardo; Sahle, Christoph J.; Huthwelker, Thomas; Dejoie, Catherine; Burghammer, Manfred; Cotte, Marine, Non-Destructive and Non-Invasive Approaches for the Identification of Hydroxy Lead–Calcium Phosphate Solid Solutions ((PbxCa_{1-x})₅(PO₄)₃OH) in Cultural Heritage Materials, *APPLIED SPECTROSCOPY*, 2024, DOI: 10.1177/00037028241243375

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Donnadio, A.; Paul, G.; Barbalinardo, M.; Ambrogio, V.; Pettinacci, G.; Posati, T.; Bisio, C.; Vivani, R.; Nocchetti, M., Immobilization of Alendronate on Zirconium Phosphate Nanoplatelets, *NANOMATERIALS*, 2023, 13, 742, DOI: 10.3390/nano13040742

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Perugia, June 12, 2026

Prof. Riccardo Vivani

