

IMaCris/MaKrisI Research Team

Development of advanced materials for the generation, storage and liberation of energy

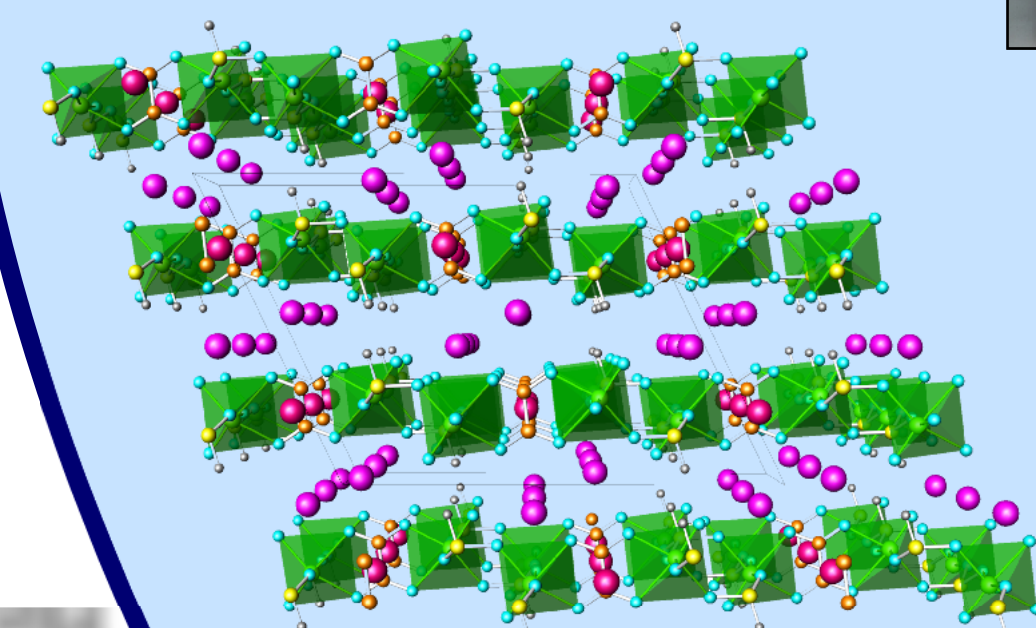
Maribel Arriortua, M. Karmele Urtiaga, José L. Pizarro, Gotzone Barandika, Begoña Bazán, Karmele Vidal, Edurne Serrano, Roberto Fernández, Arkaitz Fidalgo, Aroa Morán, Francisco LLano, Eder Amayuelas, Laura Bravo, Aritza Wain e Iñigo Pérez

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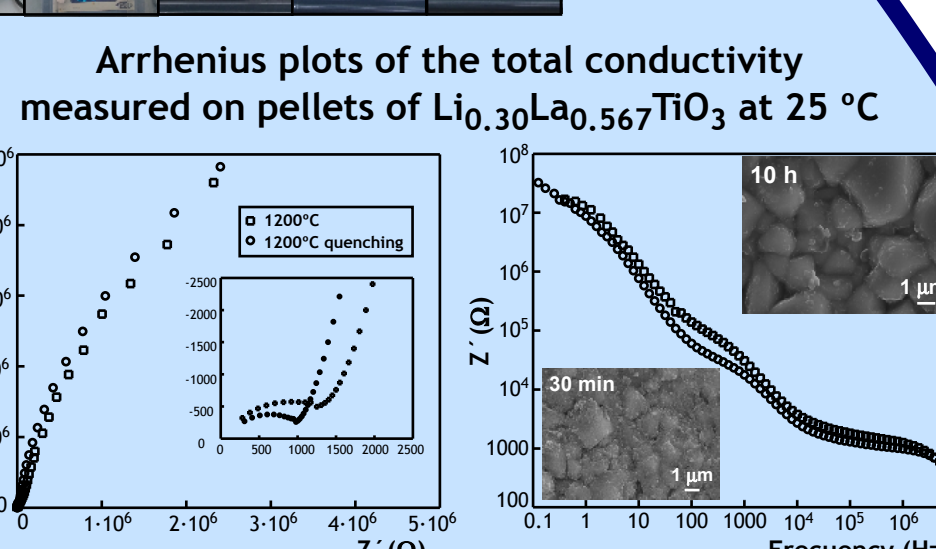
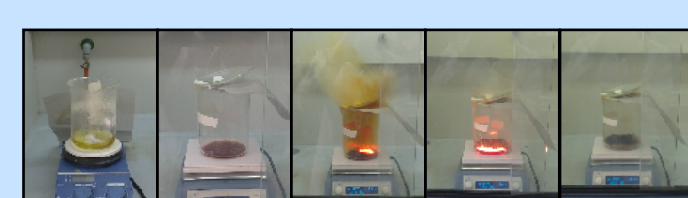
Batteries

Rechargeable

New Laminar Vanadium Cathodes

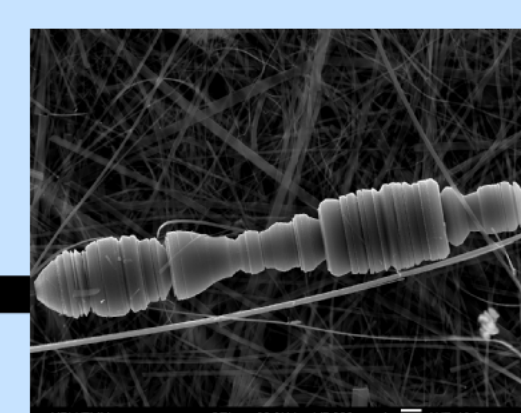
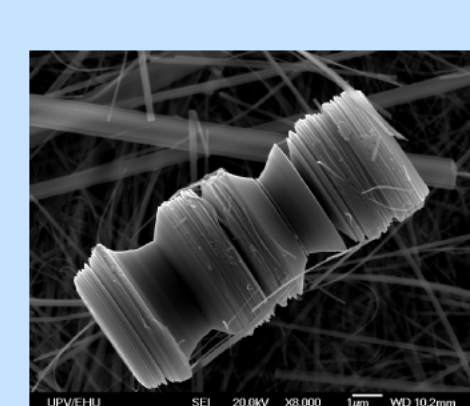


Solid Electrolytes Rare Earth Lithium Titanates

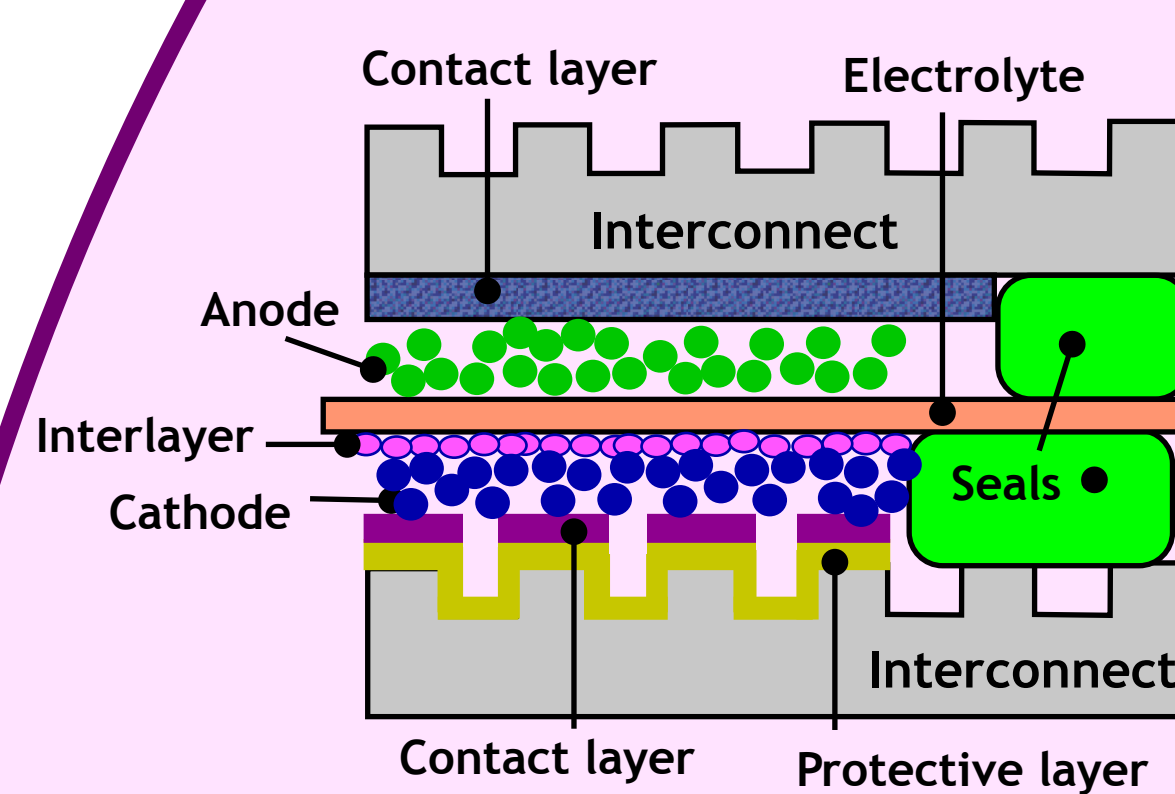


Primary

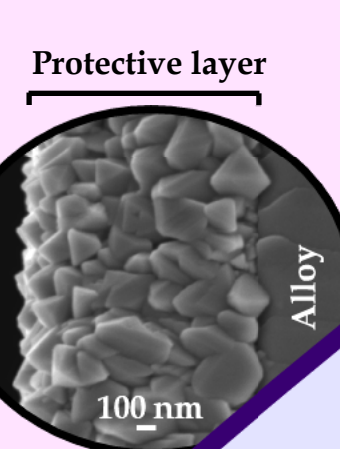
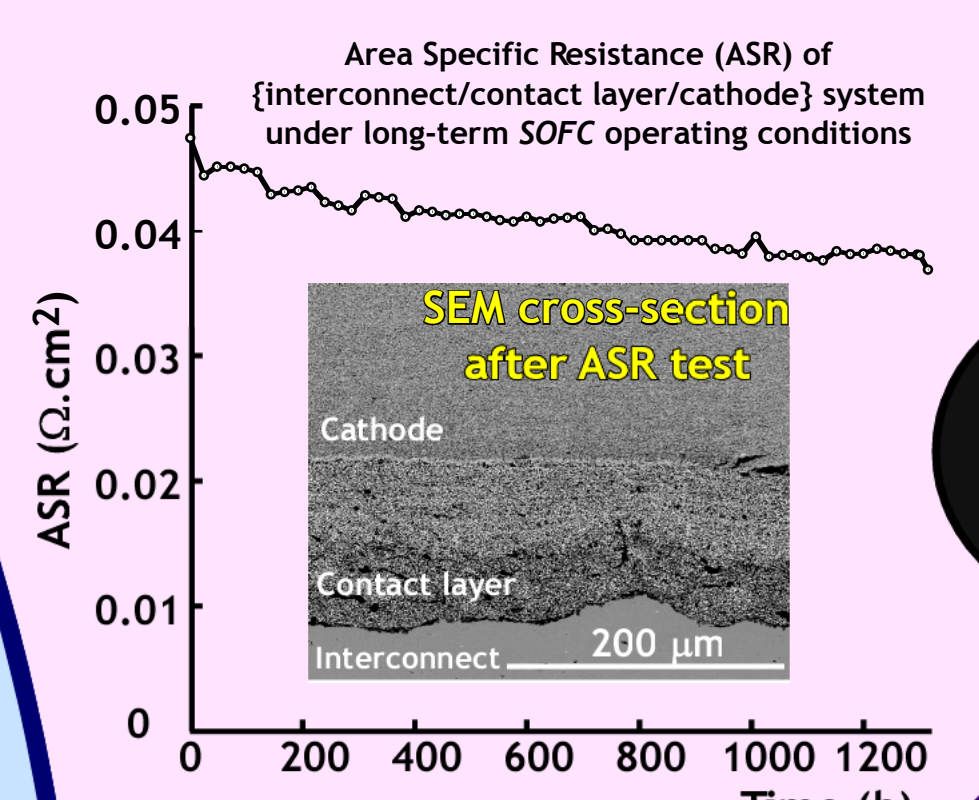
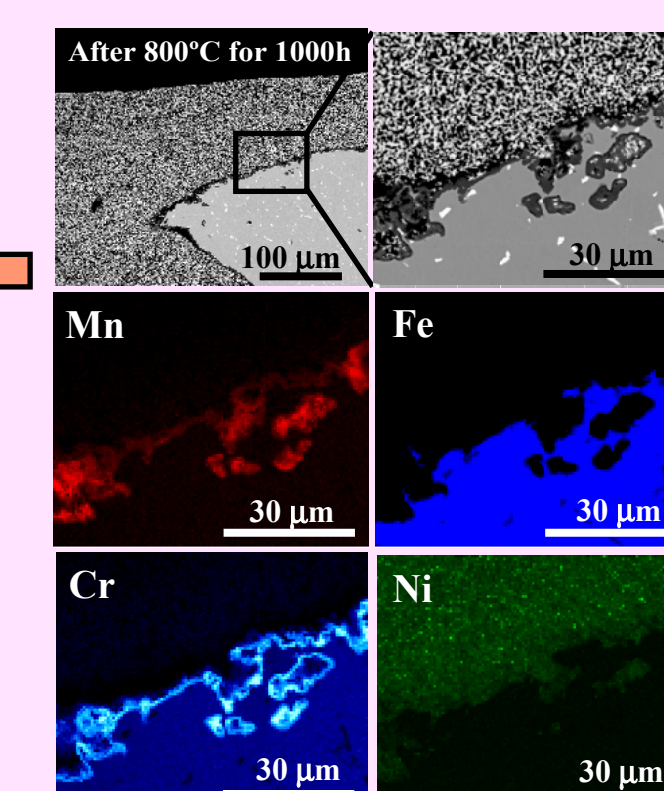
Cathodes based on Silver Nanostructured Hydrogels



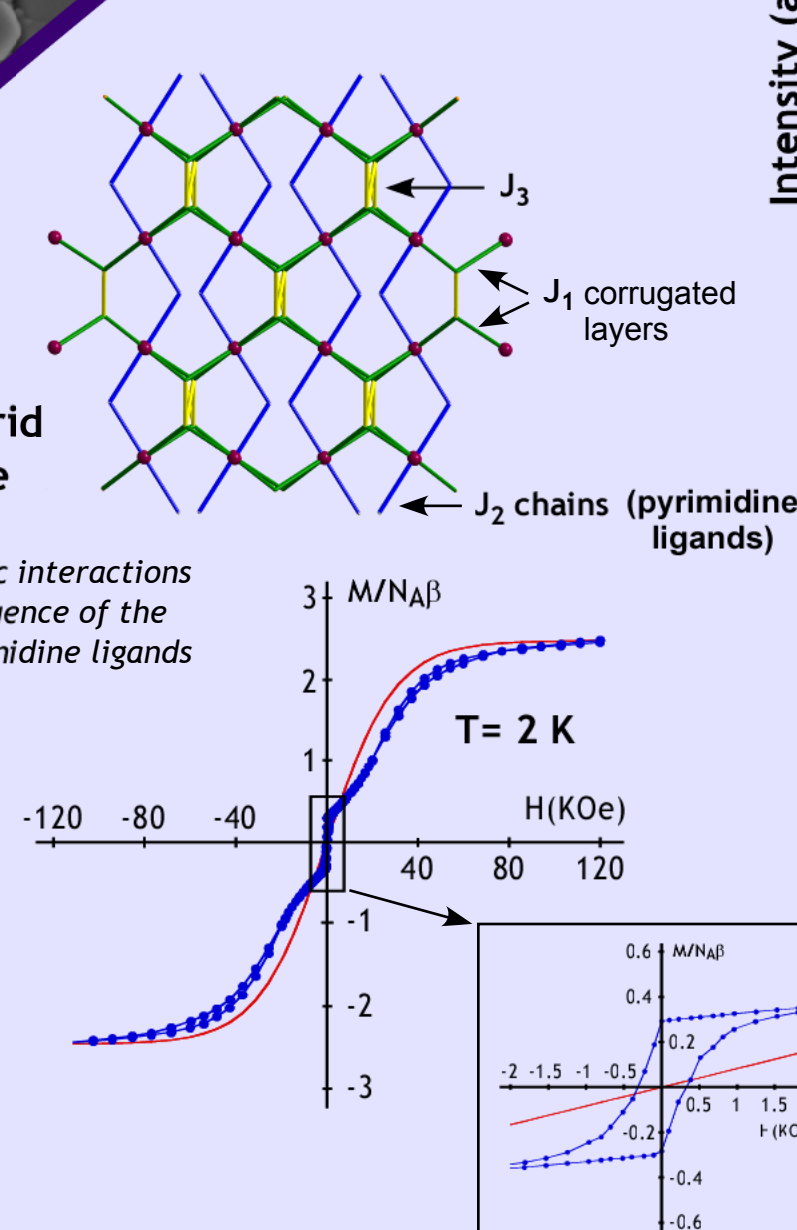
SOFC cells



Reactivity between ferritic stainless steel and ceramic contact material after treated at 800 °C for 1000h



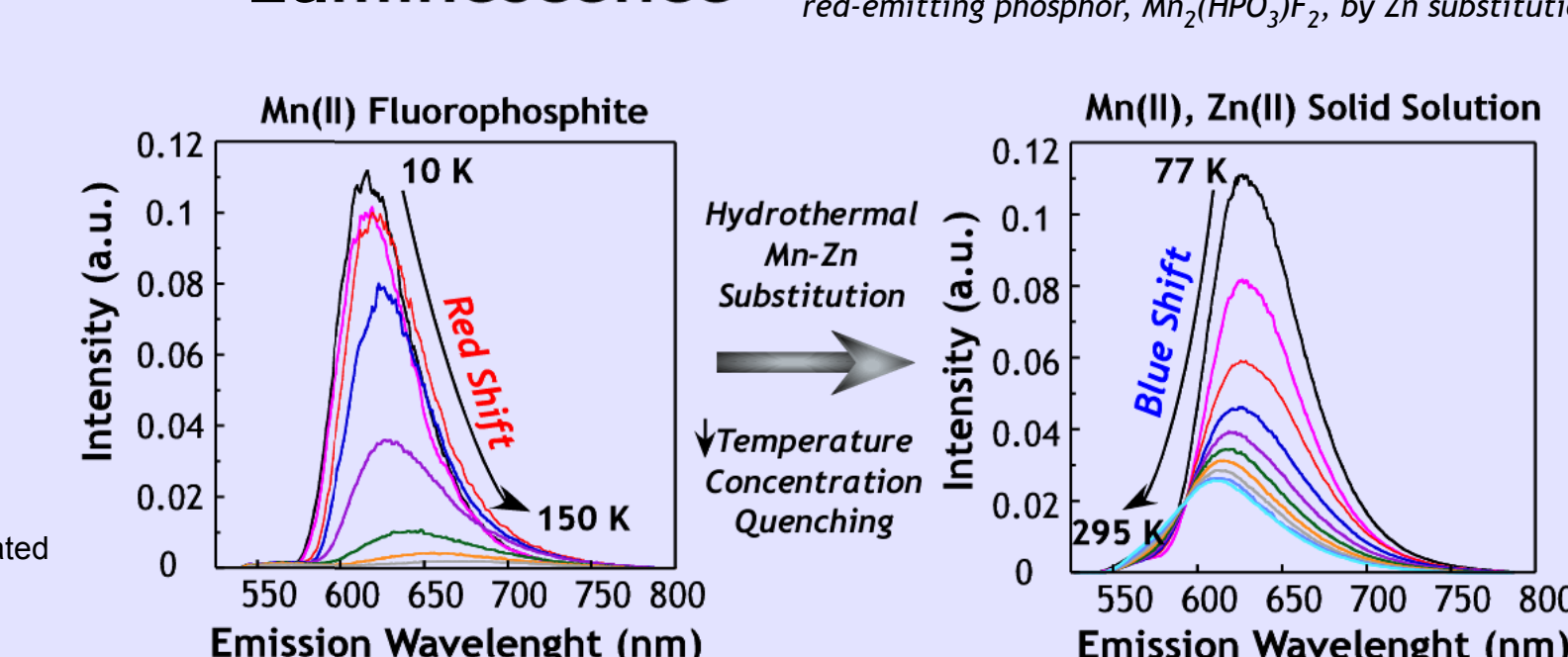
Magnetism



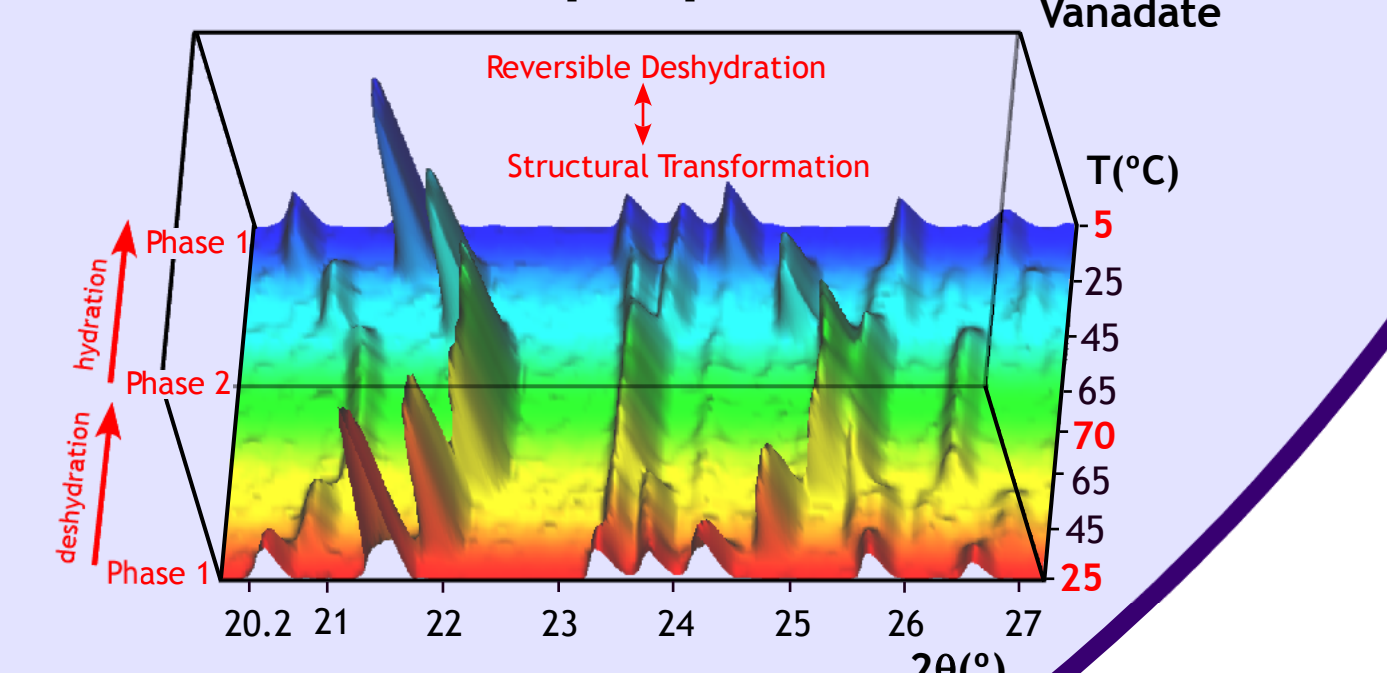
Physical Properties

Luminescence

Enhancement of the luminescent properties of a new red-emitting phosphor, $\text{Mn}_2(\text{HPO}_4)_2\text{F}_2$, by Zn substitution



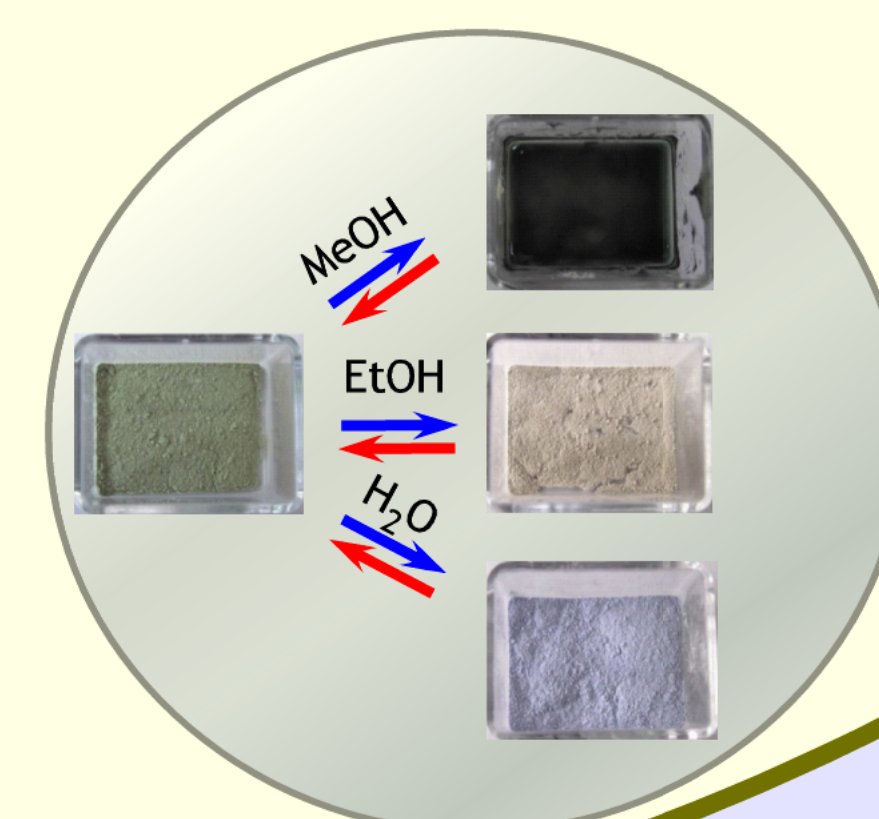
Thermal properties



Sensors

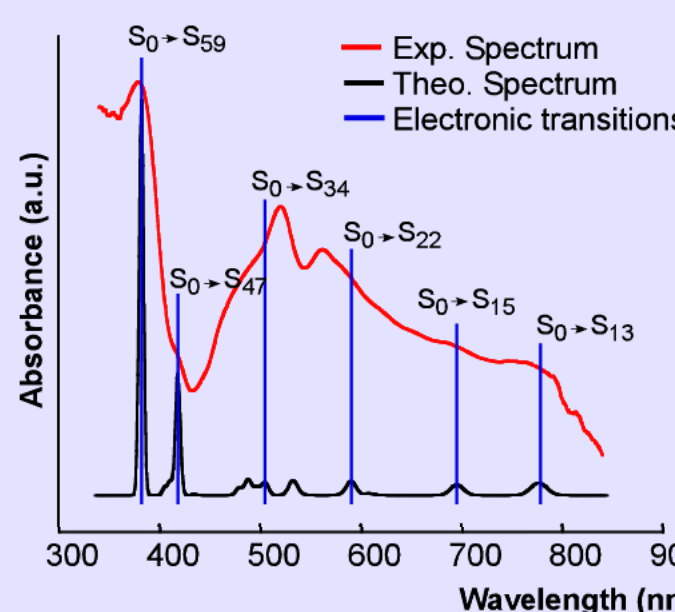
Changing the metal coordination

Coordination polymer as chemical sensor
Reversible adsorption of water, ethanol and methanol



DFT Calculations

Analysing structural features with DFT and TD-DFT calculations



Theoretical Calculations

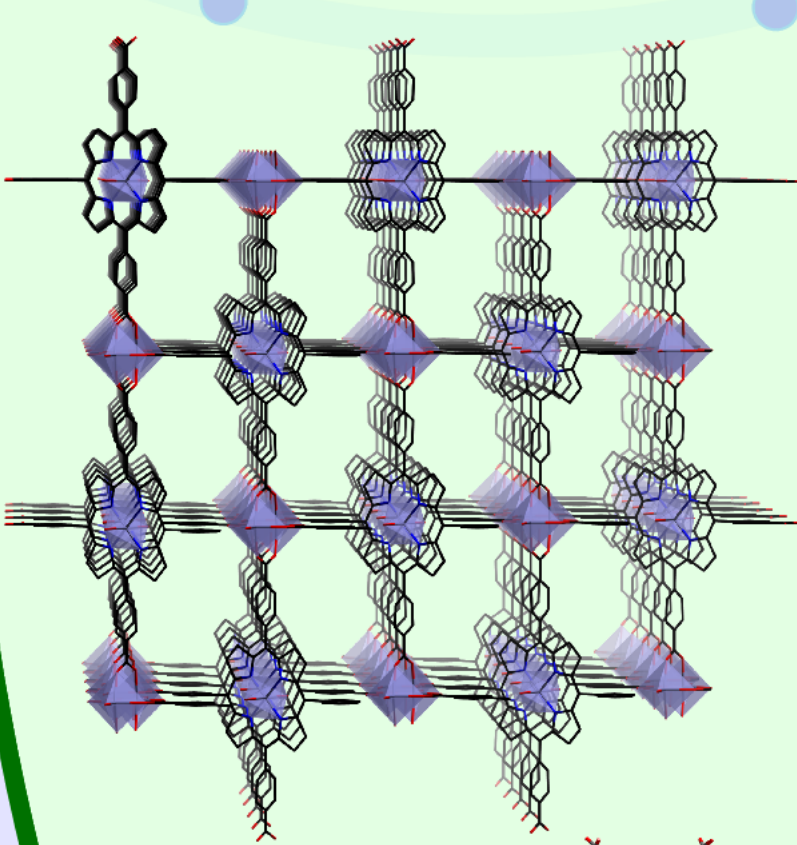
Materials Design

Hybrid Materials

Coordination Polymers (MOFs)

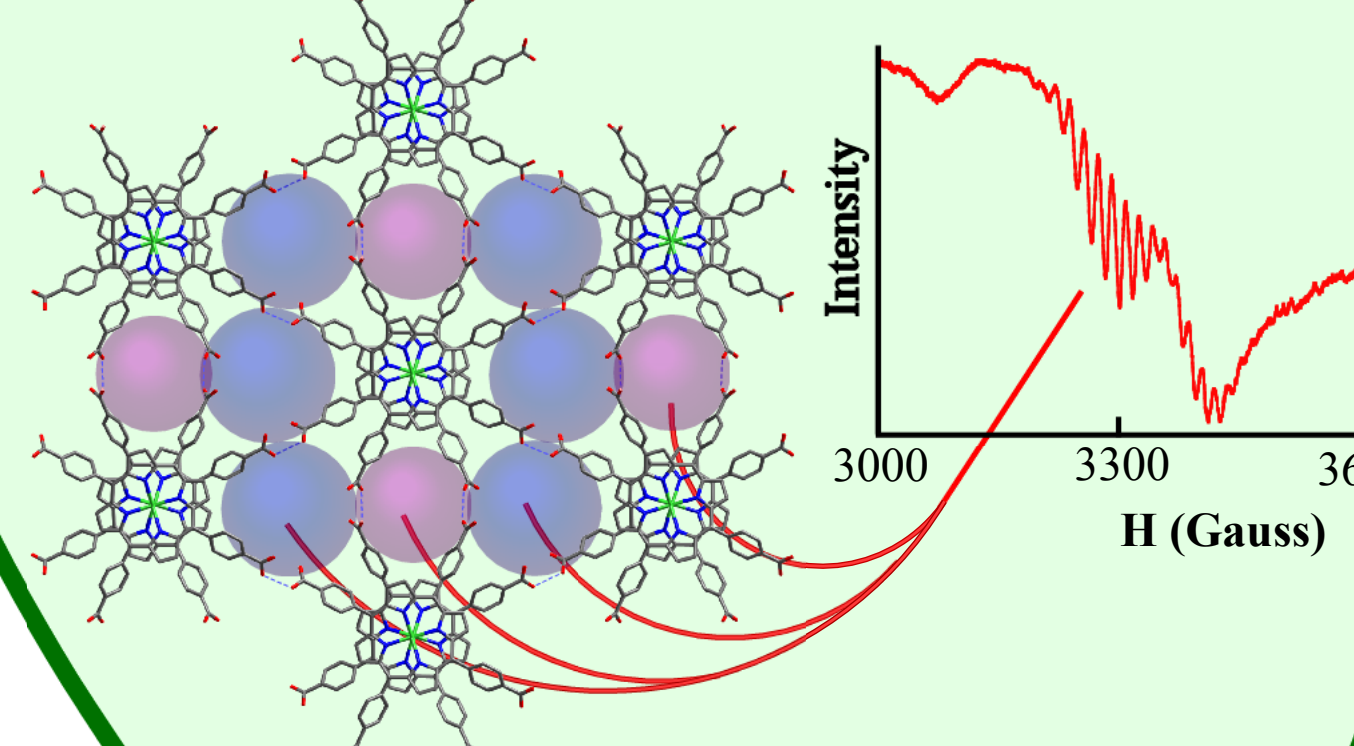
Inorganic Condensed Materials

Zeotypes



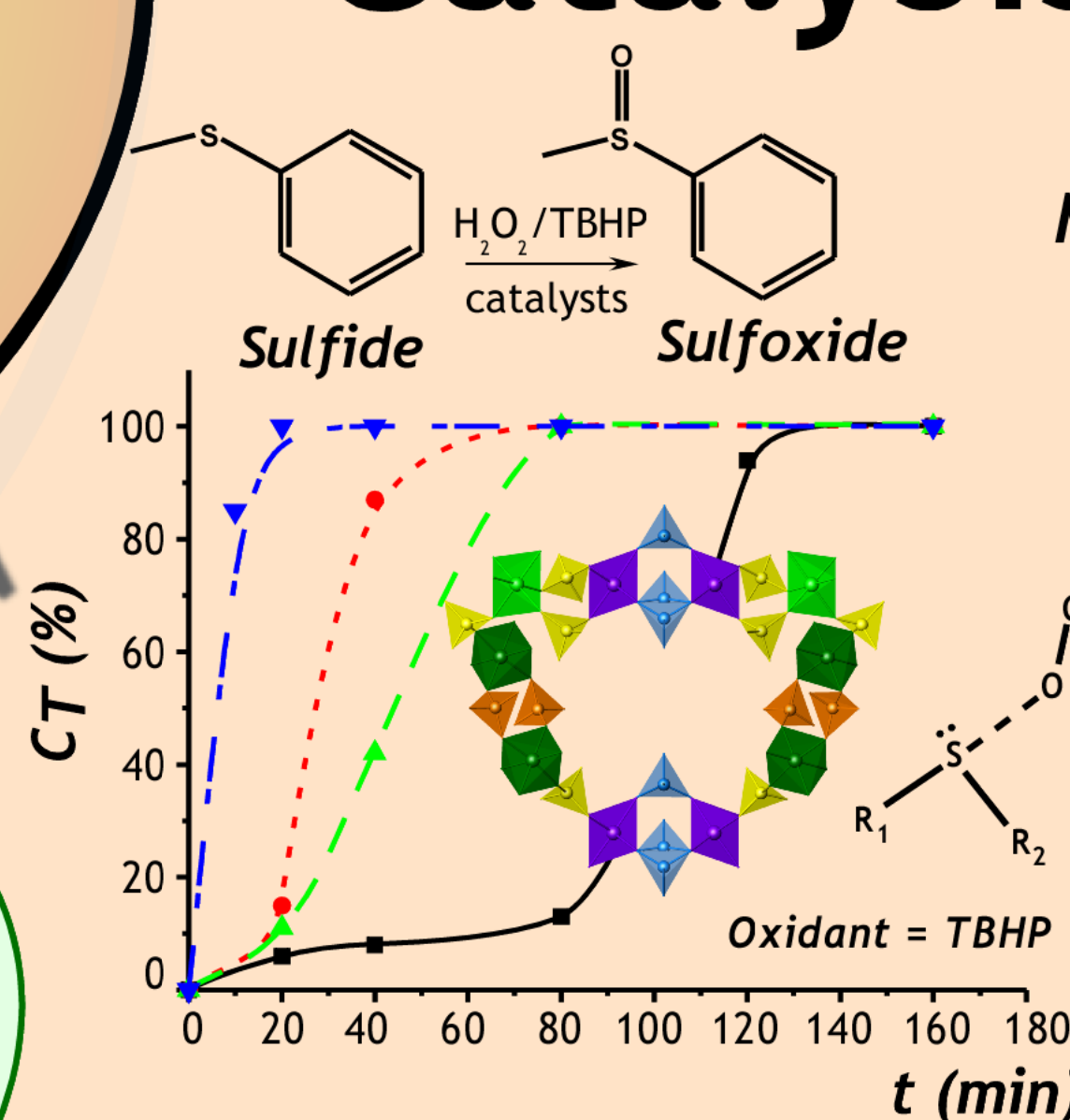
Catalytic studies with metalloporphyrins have shown are active for acetylation and oxidation of alcohols and amines

Porphyrins found in nature are capable of mimic biological functions

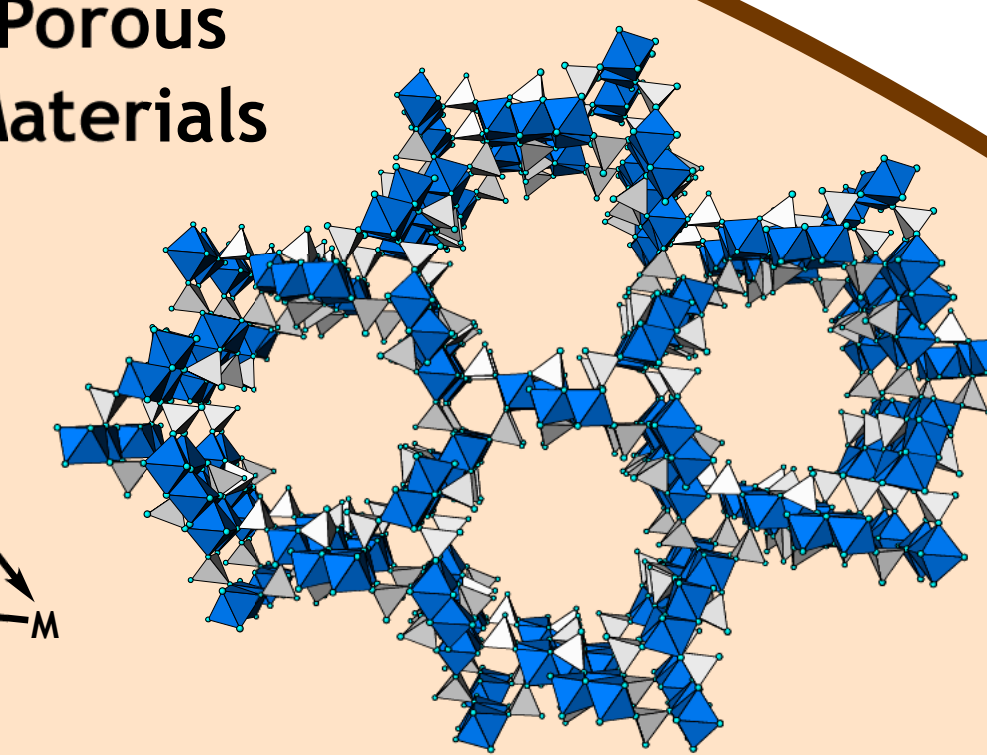


Porphyrins

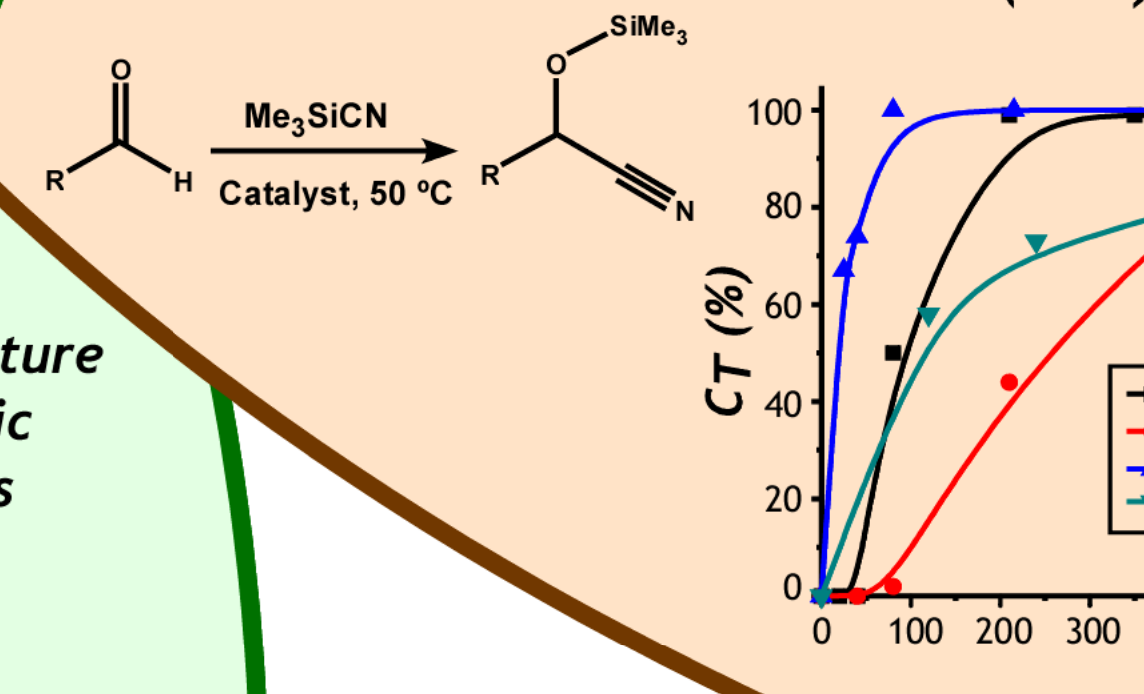
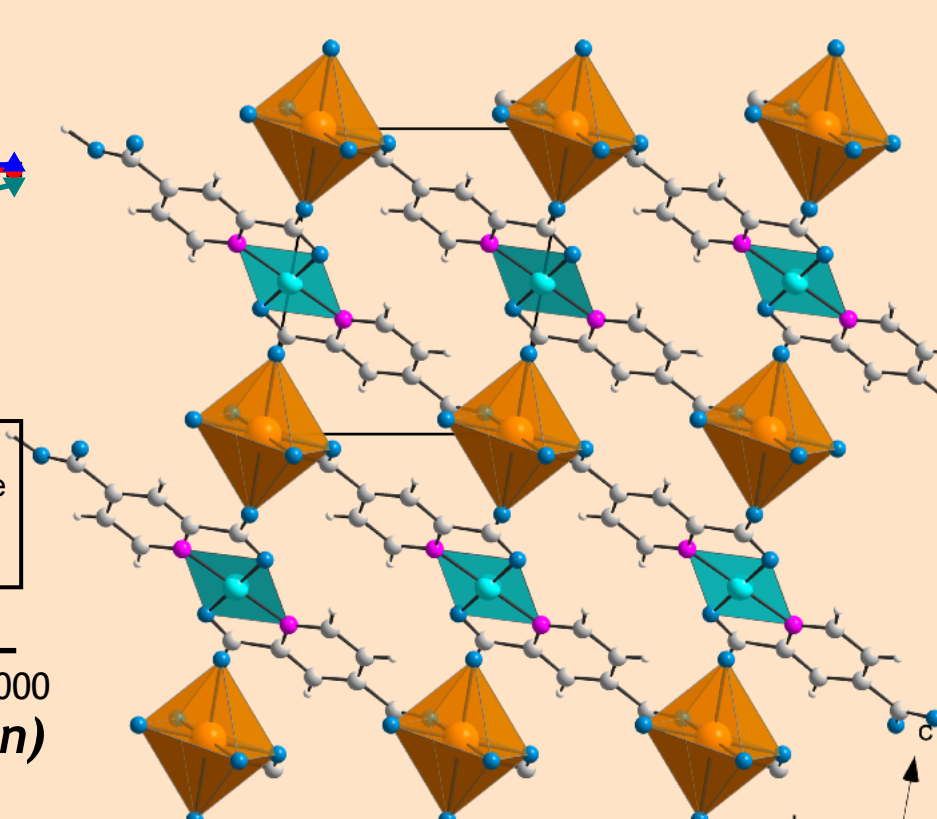
Catalysis



Porous Materials



MOF with Coordinatively Unsaturated Sites



Collaborations

- School of Chemistry, University of Birmingham.
- Department of Chemical Engineering and Biotechnology, University of Cambridge.
- Laboratoire MADIREL, Aix Marseille Université.
- Department of Chemistry, University of Saint Andrews.
- Ecole Polytechnique Fédérale de Lausanne (Suiza).
- Departamento de Ciencias, Pontificia Universidad Católica del Perú.
- Instituto de Química y de la Materia Condensada, Universidad de Burdeos (Francia).
- Departamento de Ciencias de la Tierra y Física de la Materia Condensada, CITIMAC, Universidad de Cantabria.
- Instituto de Ciencia de Materiales, CSIC, Universidad de Barcelona.
- Departamento de Química Inorgánica, Universidad de La Laguna.
- Instituto de Ciencia de Materiales, ICMM-CSIC, Universidad de Madrid.
- Instituto de Ciencia de Materiales de Aragón, ICMA-CSIC, Universidad de Zaragoza.

Latest Publications

- *CrystEngComm*, 2016, 18, 1709-1712.
- *Int. J. Hydrogen Energy*, 2016, DOI: 10.1016/j.ijhydene.2016.02.088
- *Eur. J. Inorg. Chem.*, 2015, 2015, 4699-4707, *Solid State Ionics*, 2015, 269, 24-29.
- *J. Mater. Chem. A*, 2015, 3, 19996-20012, *CrystEngComm*, 2015, 17, 6346-6354.
- *J. Solid State Chem.*, 2015, 230, 191-198, *Dalton Trans.*, 2015, 44, 213-222.
- *Int. J. Hydrogen Energy*, 2015, 40, 8407-8418, *Molecules*, 2015, 20, 6683-6699.
- *CrystEngComm*, 2015, 17, 3297-3304, *Polyhedron*, 2015, 92, 117-123.
- *Int. J. Hydrogen Energy*, 2015, 40, 4804-4818, *J. Power Sources*, 2015, 280, 505.
- "Alcohol and water sensor compounds, detection method and device", PCT Int. Appl. 2013, WO 2013057350 A1 20130425.

Patents

Funding

- Departamento de Educación, Política Lingüística y Cultura del Gobierno Vasco (Grupo Consolidado IT-630-13).
- Ministerio de Economía y Competitividad (MEC) (MAT2013-42092-R).
- Unidad de Formación e Investigación de la UPV/EHU (UFI11/15).

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