

SMS (Spectroscopy and Microscopy on Surfaces)

Objectives

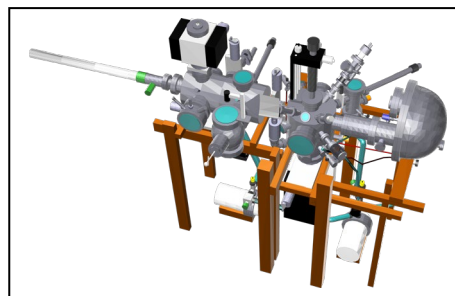
Studying the surfaces of different materials, such as: Pyrite, Gold, SiC, etc..., and their interaction with deposited organic molecules to model the prebiotic reactions that occurred during the origin and first stages of evolution of the life.

Environmental conditions

- Sample temperature range: from 300K to 1200K in sample holder computer controlled (different sampler's holders; thermal contact and field emission).
- Atmosphere: vacuum base pressure 10^{-10} mbar by turbo pumps, ionic pumps, TSP and NEG.
- Irradiation: He I-II discharge lamp, electrons (5KV), ions (5KV), X-Ray (K_{α} and Al_{α}).
- Evaporation with different types of evaporators, (solid, dust)

Analytical Techniques

- XPS (X-Ray Photoelectron Spectroscopy).
- UPS (UV Spectroscopy).
- LEED (Low Electron Energy Diffraction).
- AES (Auger Electron Spectroscopy).
- TPD (Thermal Programmed Desorption).
- STM (Scanning Tunneling Spectroscopy).



Acknowledgements in scientific papers

- **CH₄/N₂/H₂ spark hydrophilic tholins: A systematic approach to the characterization of tholins.** Marta Ruiz-Bermejo, César Menor-Salvan, Eva Mateo-Martí, Susana Osuna-Esteban, José Ángel Martín-Gago, Sabino Veintemillas-Verdaguer. *Icarus* 198 (2008) 232-241. (*XPS measurement*).
- **Do peptide nucleic acids form self-assembled monolayers on pyrite surfaces?** E. Mateo-Martí, C. Rogero, C. Briones, J.A. Martín-Gago. *Surface Science* 601 (2007) 4195-4199. (*Help during the measurements*).
- **Fossilization of Acidophilic Microorganisms.** Virginia Souza-Egipsy, Angeles Aguilera, Eva Mateo-Martí, José Ángel Martín Gago, Ricardo Amils. *Geomicrobiology Journal*, 27:692-706, 2010. (*Technical assistance during the XPS measurements*).
- **Molecular Conformation, Organizational Chirality, and Iron Metalation of meso-Tetramesitylporphyrins on Cooper (100).** David Écija, Marta Trelka, Christian Urban, Paula de Mendoza, Eva Mateo-Martí, Celia Rogero, José A. Martín-Gago, Antonio M. Echavarren, Roberto Otero, José M. Gallego, Rodolfo Miranda. *J. Phys. Chem. C* 2008, 112, 8988-8994. (*Technical support*).
- **Nucleic acid interactions with pyrite surfaces.** E. Mateo-Martí, C. Briones, C. Rogero, C. Gómez-Navarro, Ch. Methivier, C.M. Pradier, J.A. Martín-Gago. *Chemical Physics* 352 (2008) 11-18. (*Help during the measurements*).
- **Nucleic Acids and Their Analogs as Nanomaterials for Biosensor Development.** C. Briones, J.A. Martín-Gago. *Current Nanoscience*, 2006, 2, 257-273. (*Help with the manuscript preparation*).
- **Patterned conductive nanostructures from reversible self-assembly of 1D coordination polymer.** Denis Gentili, Gonzalo Givaja, Ruben Mas-Balleste, Mohammad-Reza Azani, Arian Shehu, Francesca Leonardi, Eva Mateo-Martí, Pierpaolo Greco, Felix Zamora, Massimiliano Cavallini. *Chem. Sci.*, 2012, 3, 2047. (*Technical support during XPS measurements*).
- **Spectroscopy study of cysteine adsorption on pyrite surface: From vacuum to solution conditions.** M. Sanchez-Arenillas, E. Mateo-Martí. *Chemical Physics* 458 (2015) 92-98. (*Technical support*).