

RESEARCH PORTFOLIO

Advanced Oxidation Processes and Adsorption (AOPA)

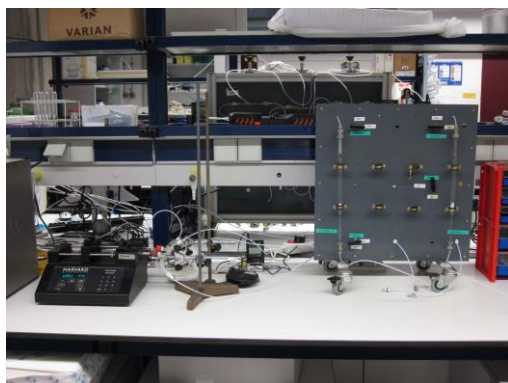
August 2025

Name of scientists in charge

- > **Dr Maria Martín**, Associate Professor, maria.martin@udg.edu
- > **Dr Alba Cabrera**, Senior post-doctoral researcher, alba.cabrera@udg.edu

Technology description

- > Adsorption on porous materials for air, gas and water treatment
- > Advanced oxidation processes (Fenton-like systems, ozone and UV radiation)
- > New strategies to obtain porous carbon adsorbents from waste materials
- > Coupling of adsorption and oxidation technologies to biological systems



Pilot plant for gas adsorption



Laboratory at UdG Faculty of Sciences

Research expertise

- > Analysis of gaseous contaminants
- > Analysis of odor causing compounds
- > Adsorption for treating of gaseous and water streams
- > Competitive adsorption of multicomponent gas streams
- > Modification of activated carbon to obtain tailored adsorbents
- > Strategies for odor control
- > Thermal and oxidative regeneration of exhausted adsorbents
- > Studies on catalytic materials for heterogeneous reactions
- > Biogas upgrading: removal of siloxanes and VOCs

Projects

- > **WatsProof:** Implementation and validation of a decision support system for the control and management of drinking water treatment plants. Spanish Research National Agency. PDC2021-121655-I00. 2021-2023.
- > **SHERLOCK:** A StEp forward in the Resilient management Of DrinkIng Water Utilities. From applied research to full-scale validation. Spanish Research National Agency. PID2020-112615RA-I00. 2021-2023.
- > **WATSON:** ToWard the development of an EDSS for wAtEr Treatment works: from basic reSearch to Optimal operatioN at full-scale. Spanish Ministry of Science. CTM2017-83598-R. 2018-2020.
- > **SILCAP:** Selective sILOxane capture for indoor pCo Air Purifiers. ACCIÓ (Marie Scklodowska Curie COFUND – Tecniospring+ fellowship). TECSPR16-1-0045. 2017-2019.
- > **BiogasApp:** Innovative technologies for biogas upgrading: from basic research to technology assessment. Spanish Ministry of Economy and Competitiveness. CTQ2014-53718-R. 2015-2017.

Publications

- > Merlo, F., Anticó, E., Merli, R., Cabrera-Codony, A., Fontàs, C., Speltini, A., Profumo, A. 2024 **Biochar-based polymeric film as sustainable and efficient sorptive phase for preconcentration of steroid hormones in environmental waters**. *Analytica Chimica Acta* 2024, 1308, 342658
- > Ben Amar, M., Mallek, M., Valverde, A., Monclús, H., Myers, T. G., Salvadó, Alba Cabrera-Codony, **Competitive heavy metal adsorption on pinecone shells: Mathematical modelling of fixed-bed column and surface interaction insights**, *Science of The Total Environment*, Volume 917, 2024, 170398.
- > Valverde, A.; Cabrera-Codony, A.; Calvo-Schwarzwalder, M; Myers, T.G. 2024 **Investigating the impact of adsorbent particle size on column adsorption kinetics through a mathematical model** *Intern. J. Heat Mass Transfer* (218) 124724
- > Myers, T., Cabrera-Codony A., Valverde, A. (2023) **On the development of a consistent mathematical model for adsorption in a packed column (and why standard models fail)**, *International Journal of Heat and Mass Transfer*, Volume 202, Article number 123660.
- > Cabrera-Codony A., Ruiz B., Gil R.R., Popartan L.A., Santos-Clotas E., Martín M.J., Fuente E. (2021). **From biocollagenic waste to efficient biogas purification: Applying circular economy in the leather industry**, *Environmental Technology & Innovation*, Volume 21, 101229.
- > Santos-Clotas E., Cabrera-Codony A., Martín M.J. (2020). **Coupling adsorption with biotechnologies for siloxane abatement from biogas**, *Renewable Energy*, Volume 153, Pages 314 – 323.
- > Santos-Clotas E., Cabrera-Codony A., Comas J., Martín M.J. (2020). **Biogas purification through membrane bioreactors: Experimental study on siloxane separation and biodegradation**, *Separation and Purification Technology*, Volume 2381, Article number 116440.
- > Santos-Clotas E., Cabrera-Codony A., Boada E., Gich F., Muñoz R., Martín M.J. (2019). **Efficient removal of siloxanes and volatile organic compounds from sewage biogas by an anoxic biotrickling filter supplemented with activated carbón**, *Bioresource Technology*, 294, 122136.
- > A. Cabrera-Codony, E. Santos-Clotas, C.O. Ania, M.J. Martín (2018). **Competitive siloxane adsorption in multicomponent gas streams for biogas upgrading**, *Chemical Engineering journal* (344), pp 565-573.
- > A. Cabrera-Codony, R. González-Olmos, M. J. Martín (2017). **Zeolites as recyclable adsorbents/catalysts for biogas upgrading: removal of octamethylcyclotetrasiloxane**, *Chemical Engineering Journal* (307), pp 820-827.