RESEARCH PORTFOLIO

Advanced Oxidation Processes and Adsorption (AOPA)

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Name of scientists in charge

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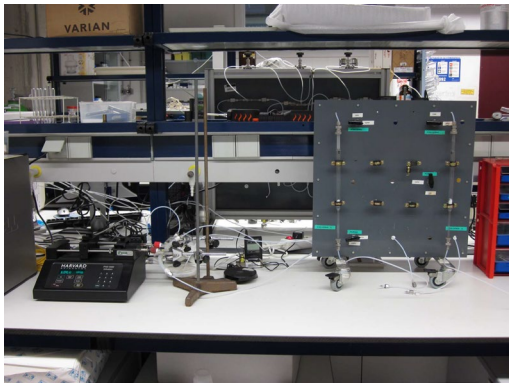
Technology description

> 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

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Projects

MORIARTY - **Bridging the Water Gap: A Step Forward in Multifaceted Risk Evaluation in Supply Scenarios with Regenerated Wate**r. Spanish National Research Agency AEI. Call: Proyectos de Generación de Conocimiento. Ref: PID2024-155733OB-I00. 2025-2028.

WaterCLUE - **Online Sensing and Digitalization of Drinking Water Supply Systems for Timely Mitigation of Chemical and Microbial Risks**. Spanish National Research Agency AEI. Call: Consolidación Investigadora. Ref CNS2023-143664.
2024-2026.

Mathematical modelling of environmental pollutants capture through adsorption. Spanish Research Agency AEI. Ref: PID2023-146332OB-C21.Call: 2024-2027.

De-Cent - Portable bioelectrochemical modules for decentralised mitigation of CO_2 emissions using surplus energy. Spanish Research Agency AEI. Call: TED2021. Ref. PLEC2021-007802. 2022-2025.

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.

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