Postdoctoral Position – Chemical Engineering / Process-Oriented Materials for CO_2 Capture and Conversion

Job Description/ Why We're Hiring

We are seeking a highly motivated postdoctoral researcher with a background in Chemical Engineering to work at the interface between advanced porous materials and process engineering. The position is linked to two ongoing Proof-of-Concept projects focused on the scale-up, shaping, and validation of MOF-based materials for CO_2 capture and conversion under realistic operating conditions:

A. MUVCORE (PDC 2025) – Development of titanium-based MOF monoliths for CO_2 methanation and RWGS reactions in modular continuous-flow reactors.

B. WETCAP (ERC Proof of Concept 2025) – Scale-up and shaping of humidity-tolerant MOF adsorbents for PSA/VSA-based CO_2 capture from wet gas streams.

The successful candidate will play a central role in translating laboratory-scale materials into process-compatible formats (monoliths, beads) and in their validation under flow, pressure, humidity, and cycling conditions, bridging TRL 3–4 to TRL 5–6. The position has a strong technology-transfer component, including interaction with industrial partners and a university spin-off.

This is a full-time postdoctoral position, initially for 1 year, with the possibility of extension depending on performance and project evolution.

Requirements and core scientific knowledge:

- **PhD in Chemical Engineering** (strongly preferred). Candidates with a PhD in Chemistry or Materials Science will only be considered if they demonstrate **clear, hands-on experience in process engineering or continuous-flow systems**.
- Solid background in **reactor operation**, **adsorption/separation processes**, or **heterogeneous catalysis under flow**.
- Experience with one or more of the following:
  - Scale-up and process optimization (batch reactors as a step towards continuous operation)
  - Fixed-bed reactors, or PSA/VSA systems
  - Gas analysis (GC, MS, breakthrough experiments)

Experimental techniques:

- Continuous-flow experimentation and reactor operation
- Gas handling, mixing, and safety.
- Characterization of porous materials (BET, PXRD, TGA, SEM) from a process-oriented perspective
- Data analysis and reporting with a focus on reproducibility and scalability.

- Optional but valued: exposure to techno-economic analysis, pilot-scale testing, or industrial collaboration

Main responsibilities:

- **Scale-up** of MOF synthesis from gram to multigram/kilogram scale.
- **Shaping** and densification of porous materials into **monoliths and/or spherical beads** compatible with fixed-bed and PSA/VSA systems.
- Catalytic **testing** and/or adsorption testing under realistic conditions (humidity, cycling, contaminants).
- **Long-term operation** and cycling experiments to assess robustness and degradation.
- Analysis of process-relevant **metrics**: stability, reproducibility, regeneration, and performance **benchmarking**.
- Contribution to **techno-economic assessment**, reproducibility protocols, and technology transfer activities.
- **Supervision** of junior researchers and contribution to scientific reports, patents, and publications.

Applications should be **addressed to Carlos Martí-Gastaldo** and sent via email to funimatapplications@gmail.com in a single PDF document. *This file should include your curriculum vitae, professional experience, and contact details from at least 2 references from previous position*. The applications will be considered as they are received until a candidate is selected. Shortlisted candidates will be interviewed in English remotely before appointment.

Please note that because of the large number of applications expected we will not be able to give individual detailed feedback to unsuccessful applications. Your application will be treated confidentially.