TOGETHER-FOR-CO_2

(Nano)material based plasmon induced photocatalytic CO_2 reduction with water in the gas phase

Research location: LPCNO-INSA Toulouse, team NCO (nanostructures et chimie organométallique), France
Contract: CDD Post-doc INSA
Themes: Nanoparticles synthesis (Au, Pt, TiO_2…), metalorganic chemistry, photocatalysis, CH_4
Start date: September / October 2023; Duration: 24 months (12 months renewable)
Web page : https://lpcno.insa-toulouse.fr/fr/

Job description:
The ANR project **Together for CO_2** started February 2023 (42 months duration). This joint research associates four French teams : the Institut de chimie et procédés pour l'énergie, l'environnement et la santé (ICPEES, Strasbourg), the Institut Fresnel (IF, Marseillle), the laboratoire de chimie de coordination (LCC, Toulouse) and the laboratoire de physique et chimie des nano-objets (LPCNO, Toulouse). In this frame, we are seeking for a materials chemist who will be located in Toulouse to lead the synthesis and characterization of the photocatalytic materials of the study.
The work aims at the synthesis of organometallic gold precursors (organometallic chemistry), their characterization (NMR), the synthesis of gold and/or platinum nanoparticles (NPs) of well-controlled mean size (from around 2 nm to 20 nm) and narrow size dispersion, their deposition on different metal oxide substrates and characterizations (SEM and TEM electron microscopy, XPS, UV-vis, Raman, FTIR spectroscopies...). The preparation of the photo-catalyst will take place at the LPCNO (synthesis and deposition of Au and Pt NPs). This study is in collaboration with the LCC partner (located nearby LPCNO in Toulouse) for the synthesis of the organometallic gold precursors used for Au nanoparticle's preparation.
The catalytic supports will be sent to our partner ICPEES for the photocatalytic conversion of CO_2 to CH_4 under UV-vis illumination. The surface plasmon properties will be studied by IF. The candidate will therefore also drive a continuous scientific exchange with the other partners to improve the preparation procedures of the catalytic materials (NPs size control, surface chemistry, surface density of NPs, Janus type or alloyed AuPt NPs).

Research profile and skills:
PhD in materials chemistry, organometallic chemistry, chemistry of nanomaterials, photocatalysis.
Experience in chemical synthesis of nanoparticles, colloidal solutions and nanoparticles films.
Experience in (nano) materials characterizations tools (electronic microscopy, X-ray diffraction, WAXS, UV-vis, FTIR, XPS, NMR…)
Autonomy and adaptability (chemistry/physics interface)
Someone able to solve problems and enjoy working in a collaborative team and international labmates
Strong communication skills (reports, oral presentation of the results)
Someone willing to work in a multidisciplinary research domain, interested both in chemistry as well as physics.

Scientific environment: As a highly multidisciplinary laboratory, the LPCNO participates in the latest advances in the field of nano-sciences in quantum optics, nanomagnetism, nanotechnologies, organometallic chemistry and theoretical chemistry.
Salary: The position is for one year and renewable, paid by INSA Toulouse, (gross salary approx. 2500€/month).
Contact:
Please send your CV with a cover letter and two references to: pfau@insa-toulouse.fr