

## **Evaluating the potentials of Metal-Organic Frameworks as direct harvesters of hydrophobic greenhouse gases from air (GHGapture)**

In the **GHGapture PhD** project, we propose evaluation of microporous Metal-Organic Framework (MOF) materials specifically encoded to trap in a high selective manner hydrophobic Greenhouse Gasses (GHGs) as methane and PF6 from the atmosphere. We will apply a combination of forefront Inelastic and Quasielastic Neutron Scattering (INS and QENS, respectively) and laboratory based characterization protocols (e.g. crystal X-ray diffraction, solid NMR, conventional and fast differential scanning calorimetry and room-pressure/temperature home-made gas adsorption experimental set-ups) to (i) understand the underpinning interactions and mobility of the target gas molecules within these microporous frameworks, and (ii) evaluate the potentials of the specific functions encoded within MOFs for the direct capture of the hydrophobic GHGs.

We are seeking for a motivated PhD student in chemistry, physics, engineering or materials science areas. The three-years pre-doctoral project will be developed at the ILL- Institut Laue-Langevin, one of the world's leading facilities in neutron science & technology, and in close collaboration with the Basque Center for Materials, Applications and Nanostructures (BCMaterials). The student will be jointly supervised by Dr. Mónica Jiménez-Ruiz (instrument scientist of the neutron vibrational spectrometer IN1-Lagrange) where the student will be introduced into the application of neutron scattering techniques for the characterization of materials, as well as in computational calculations to evaluate the host/guest chemical interactions and the gas mobility in the MOF. In parallel, the student will develop different secondments at the BCMaterials under the supervision of Dr. Roberto Fernández de Luis and Dr. José María Porro, in order to develop, characterize and evaluate the performance of MOF materials for the direct capture of hydrophobic GHGs from the atmosphere.

**For a detailed information about the specific conditions the PhD students may consult the following link:**

**<https://www.ill.eu/careers/all-our-vacancies/phd-recruitment/phd-work-at-the-ill>**

If you are interested send your CV and a motivation letter to the following e-mail addresses:

**[jimenez@ill.fr](mailto:jimenez@ill.fr)**

**[jm.porro@bcmaterials.net](mailto:jm.porro@bcmaterials.net)**

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Deadline: 1<sup>st</sup> February 2023