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The goal of the project is the development of optical gas sensors emitting in the NIR region based on photoluminescent metal-organic frameworks (MOFs) processed into films; new MOFs will be synthesized and their structural, luminescent and gas sensing properties will be studied.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie Grant Agreement No 101034403

Evangelos Pilichos is an ONISILOS MSCA Postdoctoral Research Fellow at the Department of Chemistry, University of Cyprus. He earned his Ph.D. in Chemistry from University of Barcelona (2023) under the supervision of Prof. Albert Escuer. His research interests focus on aspects of Coordination and Supramolecular Chemistry including the synthesis, characterization and reactivity of Metal-Organic Frameworks and polynuclear metal complexes. His ongoing project, "Mixed Matrix Membranes based on Tunable Lanthanide Metal - Organic Frameworks as Near Infrared Sensors of Hazardous Gases" is funded by the ONISILOS HORIZON 2020-MSCA COFUND programme. The goal of the project is the development of optical gas sensors emitting in the NIR region based on photoluminescent metal-organic frameworks (MOFs) processed into films; new MOFs will be synthesized and their structural, luminescent and gas sensing properties will be studied. The targeted MOFs will be based on lanthanide cations (such as Yb3+, Er3+, Nd3+), serving as emissive centers, and pre-functionalized and/or elongated organic bridging ligands which may lead to MOFs with a significant pore size, containing functional groups. These structural features will facilitate the absorption of the target gas molecules and may lead to selective responses towards specific analytes. The synthesized MOFs will be processed into films (mixed matrix membranes) for the characterization of their sensing performance (response time, sensitivity, selectivity, reversibility, reproducibility, lifetime, etc.) towards specific analytes including explosive vapours (nitroaromatic compounds), toxic gases (CO, CO2) or other volatile organic compounds (VOCs).

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