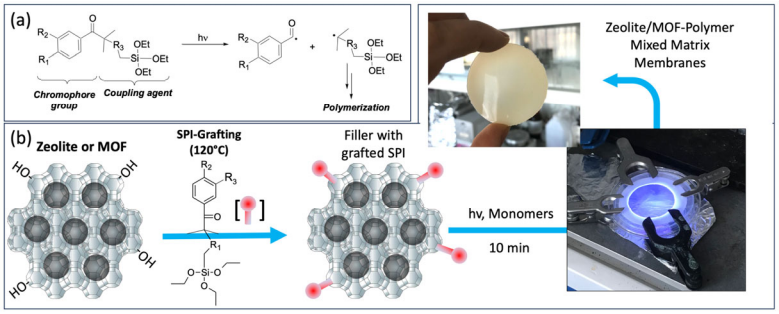
3DZEOPOL (2019-2021**),** CARNOT Institute- National Funding k€240: Preparation of Hybrid materials mixed membranes for separation of CO_2/CH_4/H_2O mixture.

The aim of the CARNOT 3D-Zeopol project was to develop new silane-based photoinitiators for the preparation of polymer@zeolite hybrid materials for membranes applications. The project has notably adjusted the new approach for synthesizing a MFI zeolite-polymer hybrid material via the photopolymerization of acrylate functional monomers (Trimethylolpropane triacrylate) on the surface of the zeolites under UV and Visible irradiation. The polymerization is initiated with a silane based photoiniator (SPI-1), previously grafted on the external surface of the zeolite MFI particles, via interactions of the ethoxy groups of the SPI with the terminal external silanols of the zeolites. The results reveal a good efficiency of the SPI-based photoiniators after grafting on the surface of MFI zeolites in the photopolymerization of acrylate monomers without affecting the accessibility of the zeolite micropores. These results are very promising and confirm the validity of the new approach.[1–4] Current collaborations are stated in order to investigate the gas permeability of the prepared membranes (MFI/TMPTA) to CO_2, and CH_4, and their selectivity to CH_4 relative to CO_2 and H_2O by pure gas permeation and mixed gas permeation (ANR project (PROMISE: 2025-228) in collaboration with Dr. Damien Voiry (Institut Européen des Membranes (IEM) Université de Montpellier) and Rémy Guillet-Nicolas (LCS, Caen). However, optimizing the process as well as the choice of the zeolite and the monomer still be needed and will be crucial for tuning the steric and hydrophobic/hydrophilic behavior of the membranes, therefore, their performance and selectivity.



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