Development & Characterization of Perm-selective Membranes Based on Zeolite and ZIF Materials

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Descriptions of Research Topics

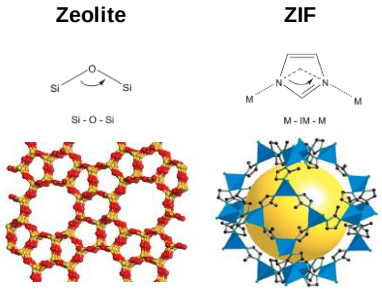
- Development of gas and organic vapor separation membranes (CO_2/N_2, CO_2/CH_4, N_2/CH_4, H_2/O_2, H_2/CO_2, H_2/hydrocarbon, *p*-xylene/*o*-xylene, etc.)
- Development of dehydration and waste water treatment membranes
- Fabrication of various types of membranes (zeolite, ZIF*, etc.)
- Characterization of defect structures in membranes

Applications:

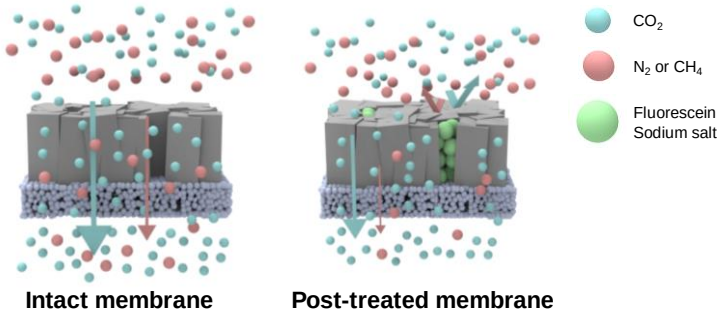
- Gas separation (Carbon Capture and Storage (CCS), biomethane upgrading, etc.)
- Dehydration and waste water treatment (H_2O/methanol, H_2O/ethanol, H_2O/IPA, etc.)
- Post treatment of membranes to improve separation performance
- Scale-up and optimization of zeolite and ZIF* membrane process
- Quantitative and qualitative analysis of defect structure in membranes with FCOM **

*ZIF: zeolitic imidazolate framework
**FCOM: fluorescence confocal optical microscopy

Structure of zeolite and ZIF

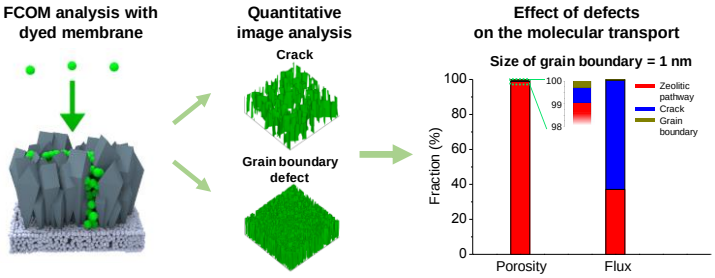


Post-treatment of membranes



Scale-up of membranes

Defect analysis of membranes



Research Fields 1 Material·Nano 2 Energy·Resource
Keywords Thin film, Zeolite membrane, ZIF membrane, FCOM analysis, Defect structure, Gas separation, Dehydration, Waste water treatment, Xylene isomer separation