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Chaiporn Kaew-on


Jomjai Boonkan

Weerapong Bootluck

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Chalad Yuenyao

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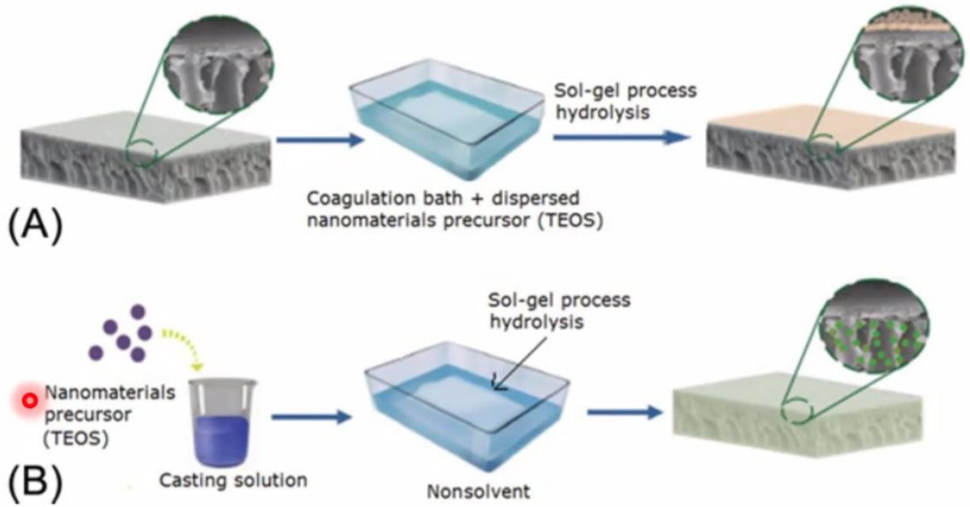
Nano-enhanced membranes prepared by sol-gel process

Sol-gel nanocoating is used to incorporate the SiO_2, TiO_2,ZrO_2, metal/metal oxide-based nanoparticle network within membranes' pores and surfaces.

Sol-gel involves hydrolysis of precursors to form a corresponding hydroxide M-OH, and polycondensation to form a network (M-O-M).



Sol-gel process for (A) in situ formation of NPs on preformed membrane's pores or surface, and (B) in situ NP formation after casting dope solution during the immersion precipitation (i.e., P

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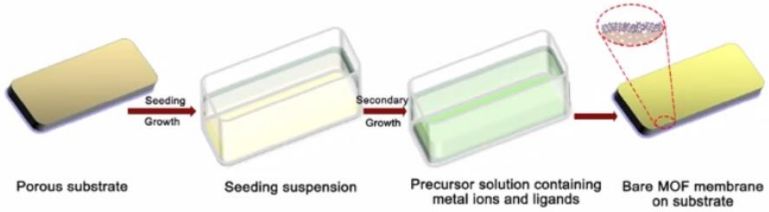
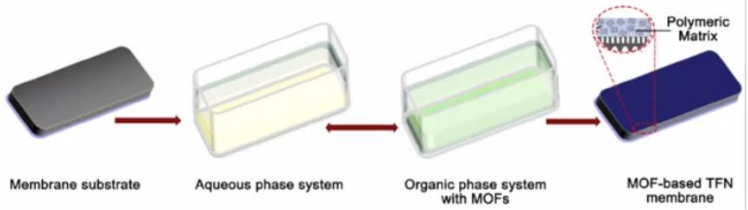
Design strategies for MOF membranes

Direct growth for bare MOF membranes

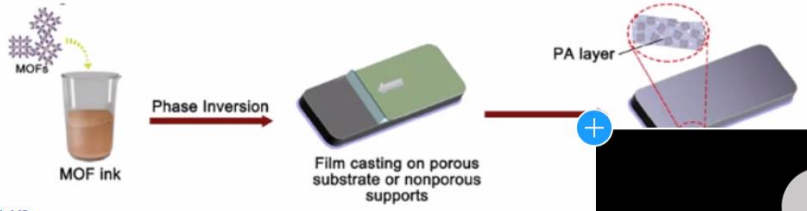
Secondary growth for bare MOF membranes



Interfacial polymerization process for MOF-based membranes



Blending method for MOF-based membranes



Li et al. Coordination Chemistry Reviews 404 (2020) 213116

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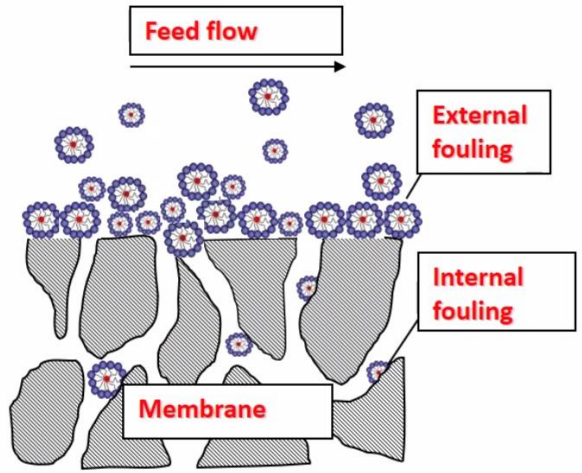
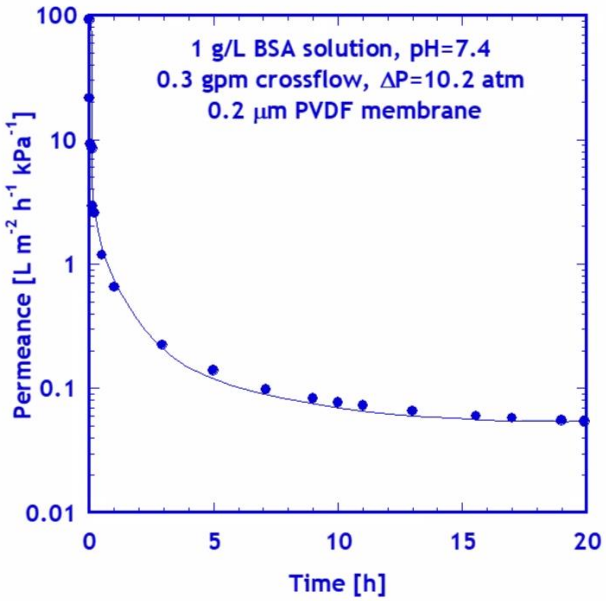
Fouling: A Major problems in membrane separation





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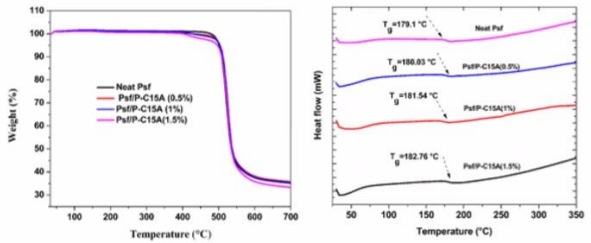
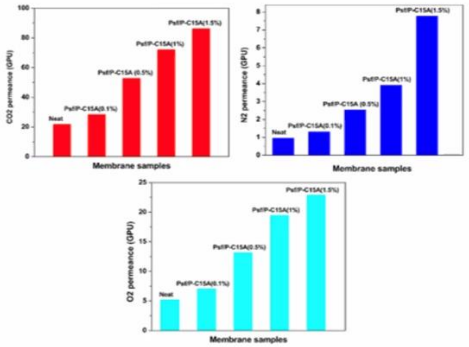
Nanocomposite Clay for Gas separation

Pillared cloisite 15A as an enhancement filler in polysulfone mixed matrix membranes for CO_2/N_2 and O_2/N_2 gas separation

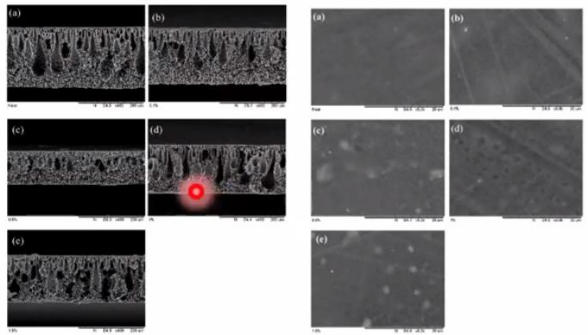


TGA and DSC analysis of neat and PSf/P–C15A membranes

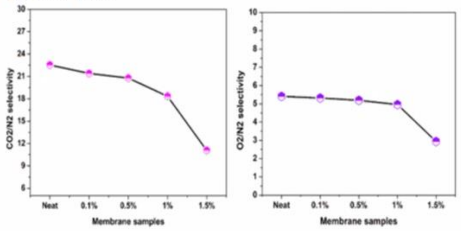
- Thermal degradation showed slightly increasing trend
- attributed to intrinsic high thermal stability of the filler particles
- SEM- white traces, indicating that the filler particles were embedded well
- absence of significant defects due to excellent adhesion between the P–C15A and



Permeance of neat and PSf/P–C15A membranes



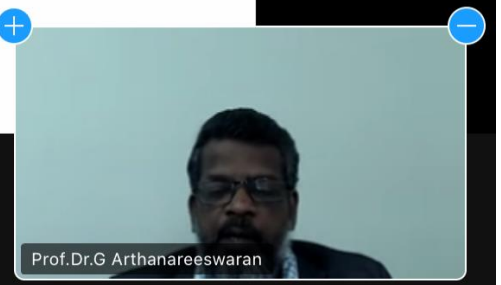
Top surface and cross section morphology of membranes



Selectivity for CO_2/N_2, and O_2/N_2 gas separation

- Results indicate a significant increase in membrane permeability at a low loading of P–C15A with an insignificant drop in permselectivity.
- efficient membrane was found to be at 1wt. % loading of P–C15A

Phalgun et al., Journal of Natural Gas Science and Engineering 86 (2021): 103720



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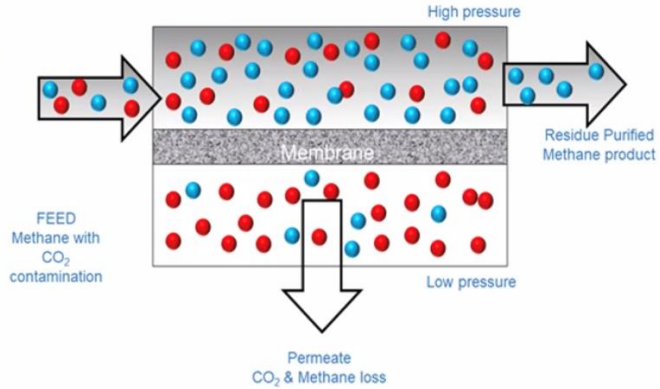
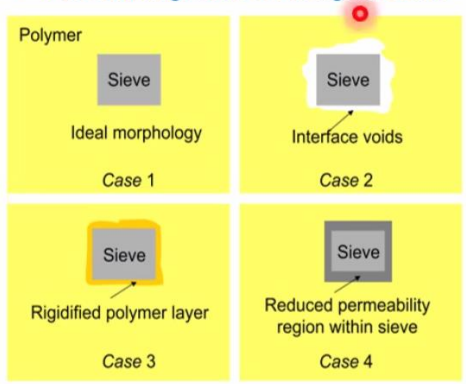
1. What is membrane Process Intensification
2. Write the driving force for pervaporation
3. What is the membrane Technology :Applications
4. Write the Classification of Membrane based on Operations
5. The selectivity is due to .....
6. Write the membrane Classification based on structure and morphology
7. Write membrane Classification based mechanism of separation
8. What are the main requirements need for membrane materials
9. Discuss the organic polymer materials: A Brief Review (Submit)
10. Explain Mixed Matrix membranes
11. Write the need toxic gas sensing
12. What are the Unique properties needed for sensing of membranes
13. Why nanostructured membranes for gas separation
14. Write the background and Milestones in Membrane Gas Separation
15. Why the current technology focus on MOF for Gas separation

Page 1 of 1 125 words English (India)

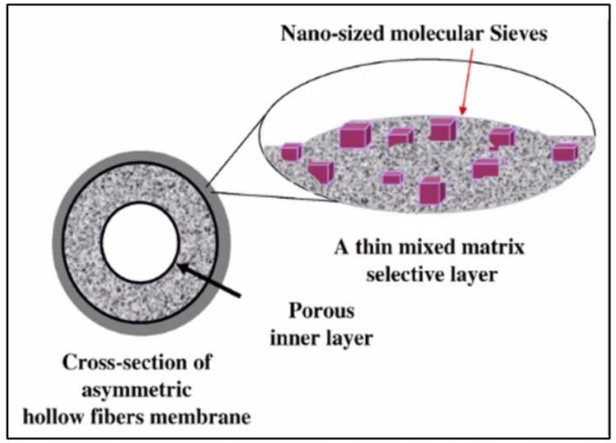
Mixed matrix membranes (MMMs) comprising organic polymers with dispersed inorganic fillers for gas separation

- Consisting of organic polymer and inorganic particle phases
- MMMs have the potential to achieve higher selectivity, permeability, or both relative to the existing polymeric mem- branes, resulting from the addition of the inorganic particles with their inherent superior separation characteristics.
  - ✓ zeolites,
  - ✓ carbon molecular sieves ,
  - ✓ activated carbons,
  - ✓ Non-porous silica, and graphite etc.
- Optimisation of interface morphologies between filler and the polymer matrices
  - Interface voids
  - Pore blockage and Chain rigidification

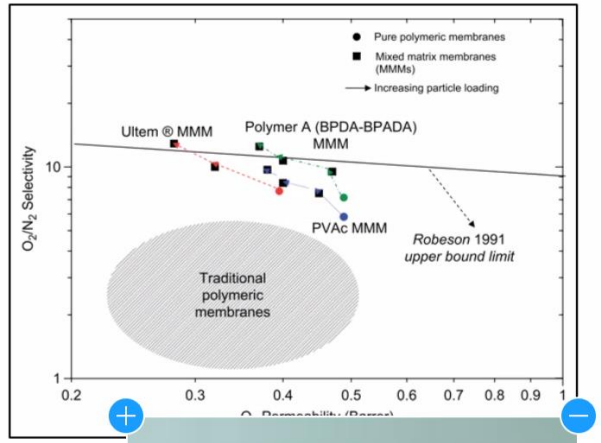




Schematic diagram of various nanoscale morphology of the mixed matrix structure



Schematic cross-section morphology of a hollow fiber with a polymer/zeolite mixed matrix skin



Mixed ma