Specialty Materials Laboratory

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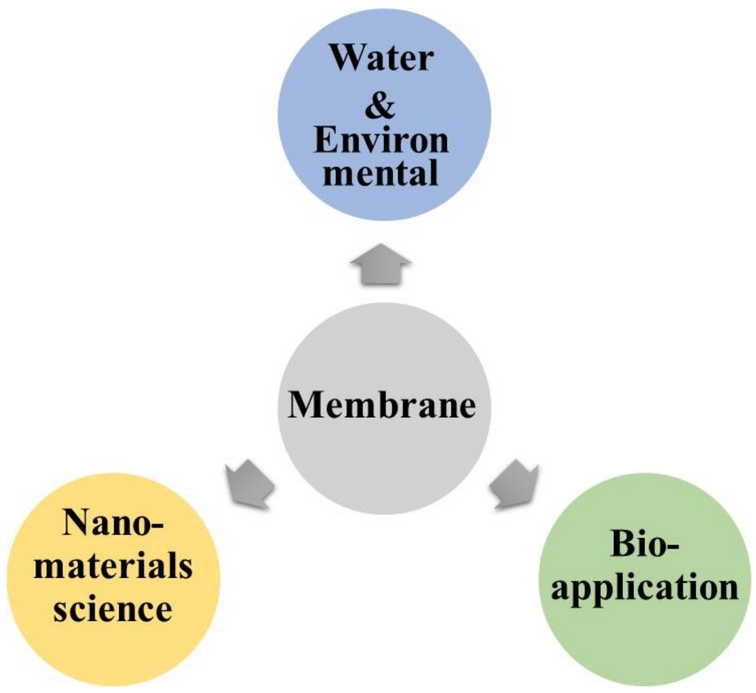


Descriptions of Research Topics

- Innovation in membrane manufacturing and process
- 3D printing and electrospinning technology
- Self-healing system using encapsulation technology
- Development of hydrophobic filler using nanomaterials

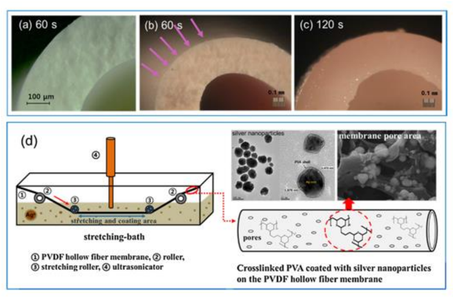
Application

- Water treatment (MF, UF, NF, and RO membranes)
- Recovery of acid solution (H_2SO_4, HCl, etc.) and Organic solvent resistant membrane
- Hemodialysis membrane
- Nanofiber filter media for superfine dust removal
- Wound dressing, sensors, acid-resistant membrane
- Hydrophobic nanostructure and polymer composite

Research Topics

Water treatment & Solvent recovery

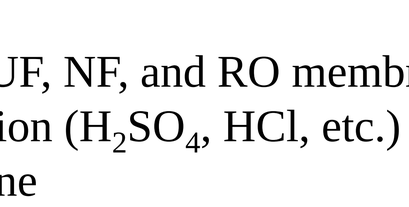
UF



<Diagram of the bath-type stretching and ultrasonic coating system: (a) 60 s sonication time with GA-PVA, (b) 60 s sonication time with GA-dyed PVA, (c) 120 s sonication time with GA-dyed PVA, and (d) the simultaneous stretching–coating combined bath>

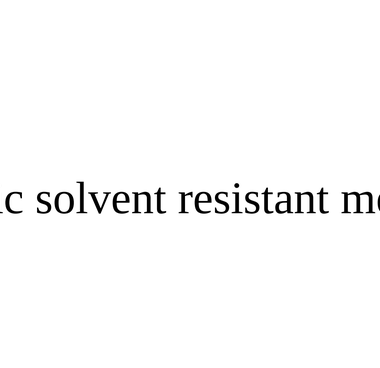
NF

Preparation of solvent resistance nanofiltration (SRNF) for removal polar aprotic solvent and polar protic solvent



<The result of methanol permeation test; (a) Feed solution, (b) NE70 membrane, and (c) SRNF

RO

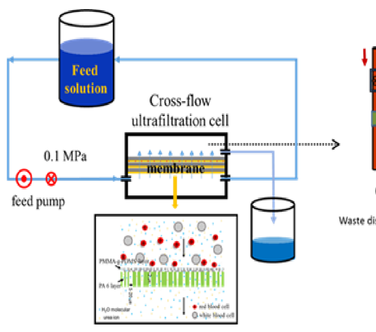


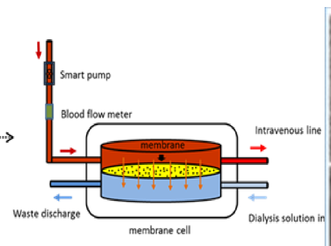
<FE-TEM image of RO membrane cross-section; (a) BWRO membrane, (b) PA-OcTES, (c) PA-OcTES-EGDE>

Biomedical

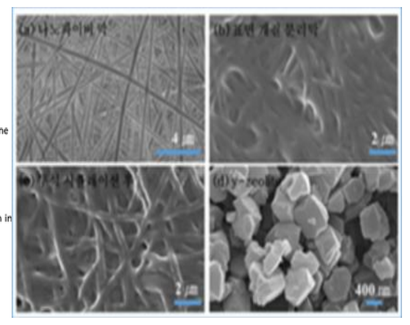
<Laparoscopic* and potable** hemodialysis machine>

* Courtesy, www.mobilysis.com
** Ref. DISC company



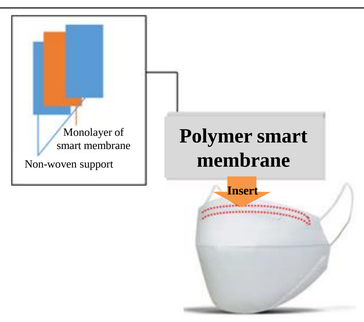


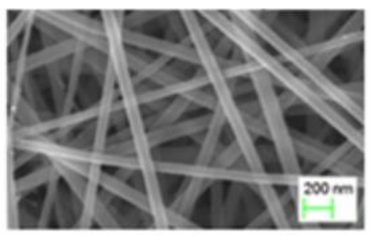
<Hemodialyzer and dialysis process>



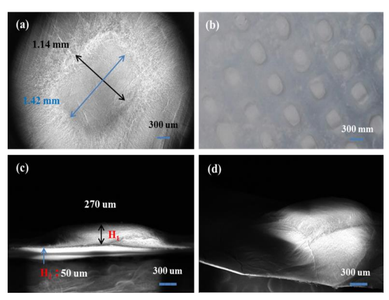
<Preparation of embossed nanofiber membrane/filter>

Superfine dust removal

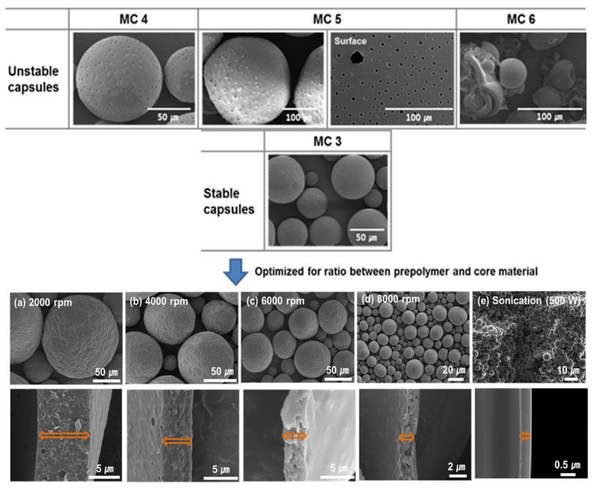




<Nanofiber membrane>

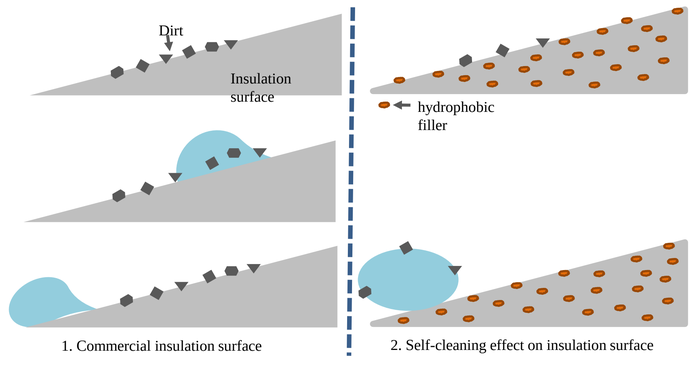


Micro-encapsulation

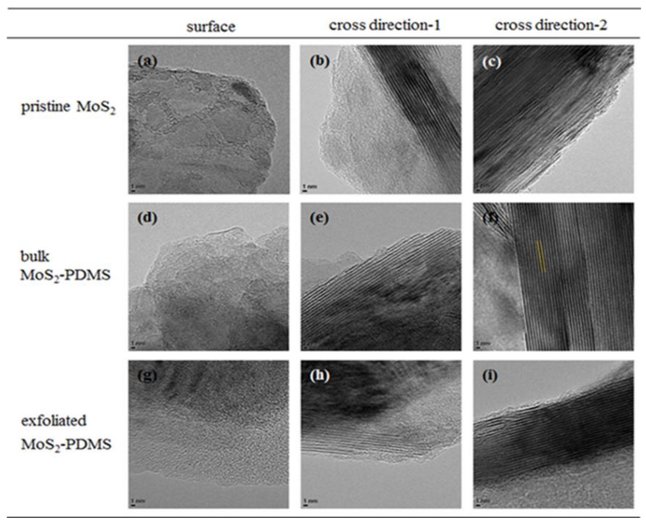


<Preparation of self-healing capsules using homogenizer and ultrasonication>

Hydrophobic nanostructure



<Self-cleaning process>



<Surface and layered structure of molybdenum disulfide (MoS_2) according to peeling process>