



Membrane for energy generation

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Descriptions of Research Topics

- Development of interfacial polymerization
- Development of UF/MF membrane
- Large scale continuous coating technology (hollow fiber and flat sheet)
- Biomimic ultra-thin ion exchange membrane
- Chemical surface modification

Applications:

- Energy generation membrane (PRO, E-PRO, Energy harvesting NF, salinity gradient, etc)
- Desalination, water treatment
- DIW water recirculation system
- Gas separation
- Sustainable coating surfaces

Hollow fiber membrane coating (inside)

TMC solution → MPD solution → Hollow fiber membrane

Hollow fiber coating process for large size module

- 1) Typical coating process: Hollow fiber membrane module is coated in three steps (1-3) times. Draw back - It is best to control the thickness of coating along fiber.
- 2) Multi-layered membrane: Advantage: Possible to control the coating of the fiber. Draw back - It is difficult to control the thickness of coating.
- 3) Maximum modulus method: Advantage: Can control uniformly the thickness of coating. Draw back - It is difficult to know the thickness of coating.
- 4) Maximum modulus method: Advantage: Can control uniformly the thickness of coating. Draw back - It is difficult to know the thickness of coating.
- 5) To use coating method: Advantage: It is possible to perform both membrane coating.
- 6) To use coating method: Advantage: It is possible to perform both membrane coating.

Max. Operation Pressure = 1-5 bar

Membrane synthesis (RO, NF, ion exchange, etc)

Configuration of hollow fiber membrane structure

Pore structure tuning

- Advantage:
 - High permeability
 - High flux
 - High selectivity
 - High fouling resistance
 - High mechanical strength
 - High chemical stability

Water flux: 100-1000 L/m²h

Rejection: 90-99%

Compression

TMV-filled membrane

ION2-P1

ION2-P2

ION2-P3

ION2-P4

ION2-P5

ION2-P6

ION2-P7

ION2-P8

ION2-P9

ION2-P10

ION2-P11

ION2-P12

ION2-P13

ION2-P14

ION2-P15

ION2-P16

ION2-P17

ION2-P18

ION2-P19

ION2-P20

ION2-P21

ION2-P22

ION2-P23

ION2-P24

ION2-P25

ION2-P26

ION2-P27

ION2-P28

ION2-P29

ION2-P30

Hollow fiber membrane coating (Outside)

연속 코팅 장치 (외부 코팅)

연속 코팅 핵심 부품

1. Wetting module
2. Heating part
3. Part arrangement

Research Fields 1 Polymeric membrane 2 Environment Resource
Keywords Hollow fiber membrane coating, RO/NF/UF/MF membrane, energy generation, water/gas separation