

## Organic–Inorganic Hybrids Consisted of 2D Nanosheets Materials

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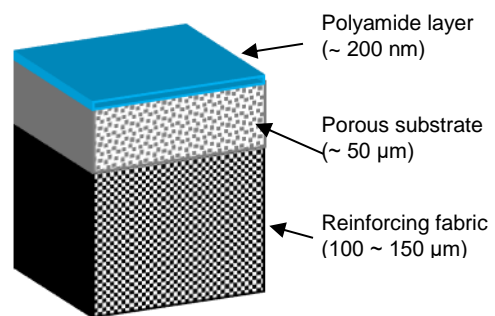
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### Preparation of Membranes Consisted of 2D Nanosheets for Desalinations

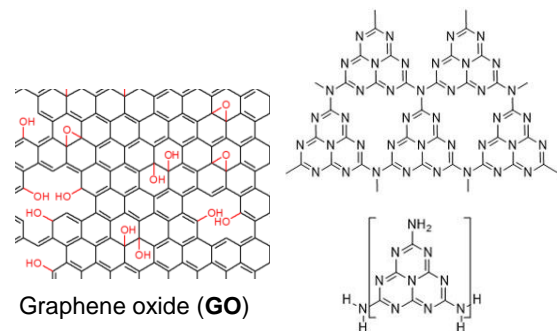
- ✓ **Freshwater crisis:** Decrease freshwater resources by climate change and decrease the availability of freshwater by growing world population.
- ✓ **Desalination of seawater:** Seawater comprises a vast supply of water (97.5% of all water on the earth).
- ✓ **Desalination techniques:** Desalination based on membranes is a primary technique due to their low energy consumption etc. Especially, reverse osmosis (RO) is the key technology for desalination.
- ✓ **Commercial RO membrane:** Thin-film composite polyamide
- ✓ **Challenges of RO membrane:** Low water permeability (required high pressure), and high fouling.



Typical RO membrane.

- **Strategy of our research:** Composite membranes consisted of 2D nanosheets materials [Graphene oxide (GO)]

- ◇ Easy preparation of single atomic layers
- ◇ Hydrophilic (easy to disperse into aqueous solution)
- ◇ Mechanically strength
- ◇ Large area nanosheets
- ◆ GO Layered films: Easy separation of each GO during the long-time immersion to water (in the desalination system)



**Sustainable desalination membrane**

### [Carbon nitrides (CN)]

- ◇ Mechanically strength
- ◇ Similar chemical structures to GO: Intermolecular interaction between GO and CN
- ◇ Visible light responded photocatalysis
- ◆ Morphology control