



## TECHNOLOGY

# Graphene Oxide Water Separation Membranes for Water Purification

## OVERVIEW

### Background:

In recent years, nanomaterials have been extensively used in membrane synthesis and surface modification to improve membrane performance (e.g., flux, antibacterial property, fouling resistance, photocatalytic property) and to optimize the operation of membrane processes (e.g., energy consumption, maintenance requirement). Because the use of these nanomaterials often relies on expensive materials, costly facilities, and highly complex synthesis, it becomes very desirable to make high performance water separation membranes using low-cost raw materials and facile yet scalable synthesis methods.

### Innovation:

Researchers at the University of Maryland have designed a novel procedure to synthesize a new type of water separation membrane using graphene oxide (GO) nanosheets. These membranes have a high water permeability and improved selectivity for targeted contaminants. The GO membrane has exhibited a number of fascinating advantages over existing membranes. It uses graphite as an inexpensive raw material, significantly lowering the membrane fabrication cost. Also, the synthesis procedure for both GO nanosheets and GO membranes are simple and scalable, providing technical readiness for scaling up the membrane production. In the present stage, the synthesized GO membrane has a very high rejection of an organic dye with a molecular weight of around 500 Daltons, and the water flux of the GO membrane is about 4-10 times higher than that of most currently commercially available membranes with similar selectivity.

## APPLICATIONS

- Water purification
- Biological separation
- Liquid fuel purification
- Desalination
- Pharmaceutical purification
- Oil-water separation

## ADVANTAGES

- Low fabrication cost
- Scalable
- Facile fabrication

· High water flux

## **CONTACT INFO**

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## **Additional Information**

### **INSTITUTION**

University of Maryland, College Park

### **EXTERNAL RESOURCES**

- [US Patent 9,902,141](#)
- [US Patent 10,239,302](#)

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