Graphene Oxide (GO) and 2D Material Based Membranes

BACKGROUND

Membranes are essential to a wide range of industrial applications such as potable water production (for example desalination or brackish water purification), waste water remediation, water for industrial processes, water for irrigation, waste stream recycling, pharmaceutical/chemical manufacture, natural gas purification, separation of nitrogen, separation of hydrogen etc. Membrane properties and characteristics are tailored to the specific separation they are required to perform and membrane manufacturers are continually looking for material innovation that will improve performance and increase the reliability and lifetimes of their products.

THE TECHNOLOGY

Academics at the University of Manchester have developed a suite of different membranes that are applicable to a multitude of separation applications and can be further tailored to meet individual specific separation requirements:

- GO laminate membranes for forward osmosis and aqueous based filtration applications
- Chemically and physically constrained GO laminate membranes for tailored aqueous separations
- GO laminate membranes for organic based separation
- A range of 2D material membranes for tailored organic, aqueous and gaseous separation applications
- Please let us know if you would like further information about these methods

KEY BENEFITS

- A number of diverse, but complementary membranes available at the UoM means that there is likely to be a membrane that is suitable or that can be tailored to your specific separation requirements.
- Scalable manufacture
- Robust and flexible
- Efficient flux

APPLICATIONS

These membranes allow access and can be further tailored to a wide variety of separation applications but some of the most popular applications include:

- Potable water production
- Organic and aqueous separation
- Purification/recycling of wastewater streams

- Production of process water
- Desalination of sea water and brackish water
- Water softening
- Heavy metal removal
- Oil water separation
- Landfill leachate treatment
- Radioactive clean up.

INTELLECTUAL PROPERTY

We have 8 patent applications that are in different stages of prosecution (from filing in progress to recently filed, to entering national phase).

RELEVANT PUBLICATIONS

Precise and Ultrafast Molecular Sieving Through Graphene Oxide Membranes
R. K. Joshi, P. Carbone, F. C. Wang, V. G. Kravets, Y. Su, I. V. Grigorieva, H. A. Wu, A. K. Geim, R. R. Nair. DOI: 10.1126/science.1245711

Tunable sieving of ions using graphene oxide membranes
Jijo Abraham, Kalangi S. Vasu, Christopher D. Williams, Kalon Gopinadhan, Yang Su, Christie T. Cherian, James Dix, Eric Prestat, Sarah J. Haigh, Irina V. Grigorieva, Paola Carbone, Andre K. Geim, & Rahul R. Nair doi:10.1038/nnano.2017.21

OPPORTUNITY

These technologies present excellent licensing and development opportunities for companies with an interest in membrane separation or specific unmet separation needs.

CONTACT

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