

## 2<sup>nd</sup> International Conference and Expo on **Separation Techniques**

September 26-28, 2016 Valencia, Spain



### *Muataz Ali Atieh*

Hamad Bin Khalifa University, Qatar

#### **Can carbon nanomaterials revolutionize membrane separation for water treatment and desalination?**

Membrane separation is a separation process where specifically-fabricated membranes act as a semi-permeable barrier and the separation process takes place by the membrane controlling the movement rate of various molecules between two liquid phases, two gas phases, or a liquid and a gas phase. Despite its superior impact (economically and environmentally) when compared with thermal separation, membrane separation still has several drawbacks, which prevents its global reliance by people as a robust separation technology. Some of these drawbacks are the high fouling rate (organic, inorganic and bio-colloidal). Several techniques have been introduced to develop novel membranes, which exhibit anti-fouling behavior in addition, to be highly selective, permeable and stable (chemically and mechanically) which requires less replacement. Due to their attractive properties (such as stability and antibacterial behavior), the use of carbon nanomaterials have been widely practiced by scientists to fabricate smart membranes which are strong and exhibit less fouling. Additionally, the surface modification of conventional membranes by incorporating carbon nanomaterials have also been reported in several research papers for the same reasons. This review paper aims to cover the use of carbon nanomaterials in the field of membrane separation as freestanding or surface-modified membranes. The carbon nanomaterials covered are: Carbon nano tubes (CNT), graphene, graphene oxide, carbon nano fibers (CNF), MXene, carbide derived carbon (CDC) and fullerene. This presentation is important for membrane scientists/researchers who work on fabricating/modifying separation membranes using carbon nanomaterials.

#### **Biography**

Muataz Ali Atieh is an Associate Professor at the College of Science and Engineering and Senior Scientist in the Qatar Environment and Energy Research Institute under Hamad Bin Khalifa University. He has received his PhD in Chemical Engineering at the University Putra Malaysia in 2005. His research focuses on design and fabrication of different types of CVD reactors for production of micro and nano carbon materials for different applications. He has produced different materials from nanostructure materials such as carbon nanotubes, carbon nanofibers, nanocatalyst and graphene to microstructure materials such as Activated carbon, vapor grown carbon fiber, polymers and membranes. He is working in different applications such as water treatment, water desalination, water disinfection, heat transfer, nano-fluid, nanocomposite, nanocatalyst, polymerization, membrane synthesis, nanosensors and corrosion. He is the author of over 75 peer-reviewed publications, 50 conference papers, 5 published USA Patents. In 2010, he was awarded with an Excellent Research Award from King Fahd University, Saudi Arabia.

[mhussien@qf.org.qa](mailto:mhussien@qf.org.qa)

#### **Notes:**