

# Graphene Oxide Membranes for Water Purification

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Graphene-based materials, including single-layer graphene and derivatives such as graphene oxide (GO), have received growing attention from the scientific community in the past few years. It is possible to find many studies in literature about graphene-based membranes applied for water purification. In this context, GO membranes find application for their natural hydrophilicity and intrinsic stacked structure, holding inside channels whose dimension is slightly less than 1 nm. These particular properties make them promising as nanofiltration membranes for ultraselective separation and water desalination, together with their low cost, ease of preparation and scalability. In this study, the stability of GO membranes in water is analyzed, together with details about their preparation, a crucial step to improve their performances. Characterization techniques like FESEM, XPS, XRD, IR are employed to study the physical and chemical structure of GO membranes. GC-FID and UV-Vis spectroscopy are the two techniques employed to quantify the filtration performances of the GO membranes. Promising results using such membranes are shown for water purification from pollutants like toluene, hexane and methylene blue. Proof of principle of phase separation are reported together with rejection above 90% for only few ppm of pollutants in water.

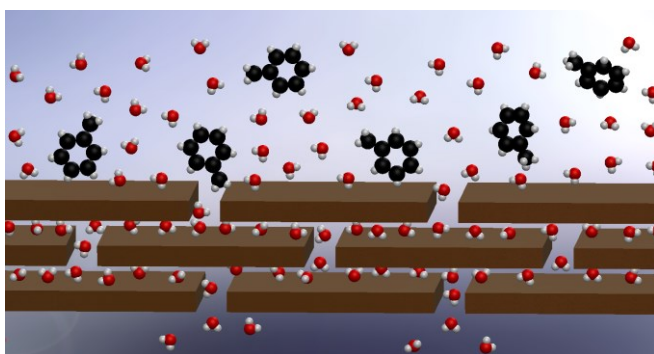


Figure 1. Working principle of GO membranes, showing the water molecules passing through the stacked structure of the membrane.