Abstract (Poster Presentation)

Graphene oxide (GO) is emerging as a promising next generation nanofiltration separation membrane material. This is fuelled by its ease of fabrication, hydrophilicity and chemical robustness which makes it a reasonable graphene substitute in several applications including separation membranes. Sonication is a necessary step in the pre-treatment of GO before use to enhance the individuality and dispersion of its nanosheets in aqueous suspensions. However it has been established that it also results in the reduction of the lateral size of individual GO sheets. This study looked co-currently into the impact of GO sonication duration onto the physical properties (size and morphology) and chemistry (functional group ratio) at different sonication times. The study further analyse the impact of the altered physicochemical properties onto the nanofiltration performance of p-Phenylenediamine (PPD) layer by layer crosslinked GO membranes. Sonication impact on GO's chemistry was evaluated using Fourier Transform Infra-Red (FTIR) and X-Ray Photospectroscopy (XPS) characterizations while Atomic Force Microscopy (AFM) and Scanning Electron Microscopy characterizations were used to evaluate the size and morphology of the nanosheets. Furthermore the interflake gap of the sonicated GO samples was analysed by X-Ray Diffraction (XRD) characterizations. Membrane surface structure and hydrophilicity were also examined by SEM characterizations and water contact angle measurements respectively. Membrane performance was in the end undertaken through methylene blue separation from water via a dead end homemade nanofiltration cell at an operation pressure of just 1 bar.