

New Insights in Membrane Autopsy

MEMBRANE PROCESSES

Membranes are increasingly applied in a variety of industries, including water and wastewater treatment, food and beverage production and gas refinement, where high throughput and reliable separation are required.

Membrane autopsy can assess the causes of unexpected loss of membrane productivity and integrity, that are directly related to end product cost and quality.

ADVANCED TECHNIQUES IN MEMBRANE AUTOPSY

The combined use of LCOCD, BET and FESEM identified and demonstrated removal from the membrane, of a problematic biopolymer foulant which was not quantifiable with conventional autopsy techniques

CONVENTIONAL MEMBRANE AUTOPSY

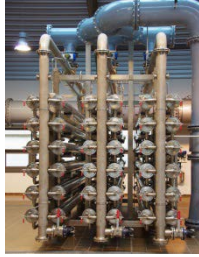
Visual Inspection: Internal and external membrane condition assessment

Loss-on Ignition: Determine the ratio of organic to inorganic fouling constituents

Inductively Coupled Plasma: Quantify inorganic elements present in the fouling layer

Scanning Electron Microscopy (SEM): Visualise the membrane and fouling layer morphology at micro scale. Use X-ray dispersive spectroscopy to identify elemental constituents.

Fujiwara Analysis: Determine the presence of oxidative damage on the membrane

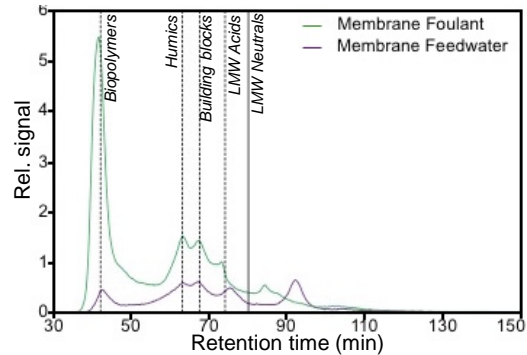


WHAT WE DO

Combining over 15 years experience and technical expertise with our access to the state of the art analytical equipment, in the Mark Wainwright Analytical Centre at UNSW, we are able to provide innovative solutions to previously unrecognised membrane failure modes.

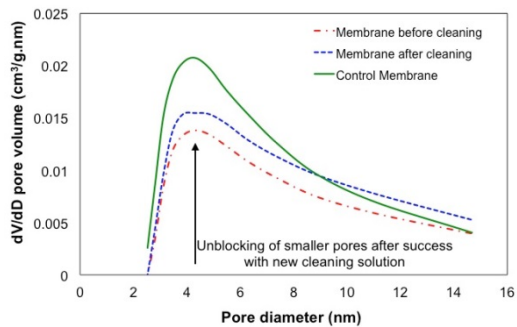
ADVANCED FOULANT CHARACTERISATION

using Liquid Chromatography Organic Carbon Detection (LCOCD)



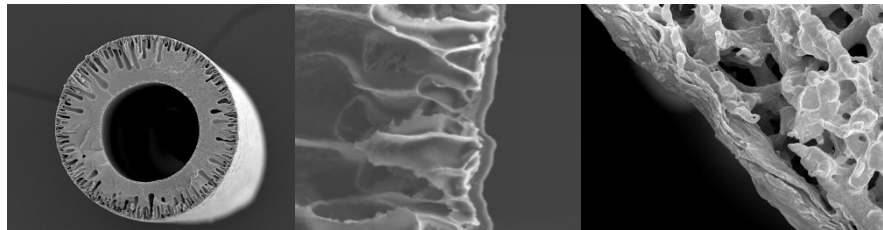
PORE SIZE DISTRIBUTION COMPARISONS

using N₂ Adsorption/Desorption (BET)



HIGHER RESOLUTION IMAGING

using Field Emission Scanning Electron Microscopy (FESEM)



SEM of membrane fibre

Standard SEM (max x20,000 magnification)

Advanced FESEM (max x100,000 magnification)