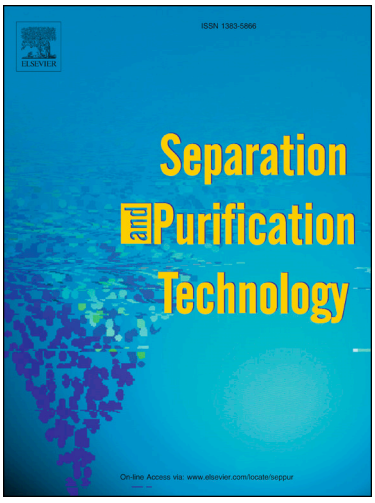

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Characterization of a support-free carbon nanotube-microporous membrane for water and wastewater filtration

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Abstract

Nonwoven carbon nanotube (CNT) laminates were characterized as support-free membranes for water filtration in terms of structural morphology, water permeability, selectivity and chemical resistance. Nominal pore rating (12-23 nm) estimated by rejection of globular proteins and fluorescence beads fall within the selectivity range of tight ultrafiltration (UF) membranes applied for wastewater treatment. The membranes displayed high permeability (120-400 LMH/bar). High selectivity regardless of high permeability seems to be due to tortuosity and pore structure of the membranes (25-50 μm thickness). The chemical stability of the membranes was tested towards common chemicals used for membrane cleaning (HCl, NaOH, NaClO) but at much severe conditions (24 h exposure at 4-10 fold higher concentrations). High resolution-X-ray photoelectron spectroscopy (XPS) was applied to evaluate chemical resistance. The relative