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Novel Hybrid Ceramic/Carbon Membrane for Oil Removal

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Abstract

A low cost and high performing hybrid ceramic/carbon symmetric membrane has been fabricated and tested. The hybrid membrane was fabricated by mixing alumina powder with high surface area powdered activated carbon (PAC). The hybrid $\text{Al}_2\text{O}_3/\text{AC}$ membrane has a developed complex network of micro and nano channels which enhanced the porosity of the membrane two fold compared to a pure Al_2O_3 membrane. Furthermore, due to enhanced pore size and porosity, the hybrid membrane exhibited super-hydrophilic characteristics with the contact angle being close to zero. The increase in the membrane roughness enhanced the surface area of the membrane, which created an increase in the membrane surface area for the filtration path. The membrane exhibited a very high removal efficiency and retention (more than 99%) of oil from an oil-in-water emulsion stabilized by a surfactant. The membrane performance has been tested

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