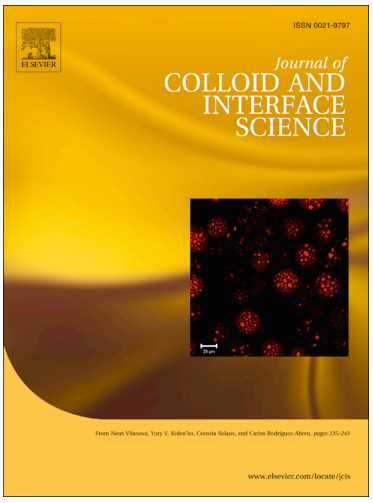

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Abstract

Development of superhydrophilic, stable and cost-effective composite membranes for efficient oil-water emulsion separation is highly desirable. Herein, an irregular rod-like composite membrane was prepared through 3-aminopropyltriethoxysilane (APTES) modification, followed by acrylamide polymerization with atomic transfer radical polymerization (ATRP). The as-prepared membrane exhibits superhydrophilicity/underwater superoleophobicity due to its irregular rod-like structure and pores-induced capillary actions. The composite membrane has demonstrated sufficient stability in acidic, alkaline and salty environments due to the polymerization of acrylamide. Moreover, the as-prepared composite membrane has effectively separated various oil-water emulsions and demonstrated high permeation and superior flux recovery. The present work demonstrates that the ATRP-assisted composite membrane is a promising material in a wide range of applications, such as industrial wastewater recovery and drinking water treatment.

Keywords: Composite membrane; ATRP; Flux recovery; Oil-water emulsions separation; Acrylamide