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Tausif Ahmad, Chandan Guria, Ajay Mandal



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Optimal synthesis and operation of low-cost polyvinyl chloride/bentonite ultrafiltration membranes for the purification of oilfield produced water

Tausif Ahmad, Chandan Guria* and Ajay Mandal

Department of Petroleum Engineering, Indian Institute of Technology (Indian School of Mines)

Dhanbad 826004, India

*To whom correspondence should be addressed. Tel: +91 3262235411. Fax: +91326 2296632. E-mail address: cguria@iitism.ac.in (C. Guria).

Abstract

The low-cost PVC/bentonite ultrafiltration membranes are prepared by phase inversion method using different coagulation baths involving de-mineralized water and aqueous saturated solution of NH_4Cl , NaCl , KCl , MgCl_2 and CaCl_2 . Effect of coagulation bath on membrane performance is investigated by evaluating ternary-phase diagram, membrane morphology, hydrophilicity, porosity, mean pore size, pore density, pure water flux and antifouling behavior using oilfield produced water. Better performing membrane with 5% bentonite loading is obtained from KCl -coagulation bath with pure water permeance- $467.5 \text{ L m}^{-2} \text{ h}^{-1} \text{ atm}^{-1}$. Response surface method

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