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**Novel Sandwich Structure Adsorptive Membranes
for Removal of 4-Nitrotoluene from Water**

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Highlights

- ▶ Novel sandwich PES-SPES/PS-PDVB/PTFE adsorptive membranes were prepared.
- ▶ The removal efficiency for 4-nitrotoluene is greater than 95 % after five recycles.
- ▶ The membrane showed higher adsorption capacity than that of mixed matrix membrane.

Abstract

Novel sandwich PES-SPES/PS-PDVB/PTFE adsorptive membranes were prepared by a filtration/immersion precipitation method and employed for the removal of 4-nitrotoluene from water. The static adsorption thermodynamics, kinetics, dynamic adsorption/desorption and membrane reusability were investigated. The results showed that the Freundlich model describes the adsorption isotherm satisfactorily. With increased PS-PDVB content, the maximum static adsorption capacity, partition coefficient, apparent adsorption rate constant, and dynamic adsorption capacity all significantly increased. The sandwich membranes showed much higher removal efficiency and adsorption capacity than those of mixed matrix membranes. With respect to dynamics adsorption/desorption, the sandwich membranes exhibited excellent reusability, with a removal efficiency greater than 95 % even after five recycles.

Keywords: Adsorptive membrane, sandwich structure, adsorption, PS-PDVB microspheres, 4-nitrotoluene

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