



## Pervaporation performance of trifluoroethoxy substituting polyphosphazene membrane for different organic compounds aqueous solutions

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### ABSTRACT

A series of phosphazene heteropolymers (NP (OC<sub>6</sub>H<sub>4</sub>C<sub>3</sub>H<sub>5</sub>)<sub>x</sub>(OC<sub>6</sub>H<sub>5</sub>)<sub>y</sub>(OCH<sub>2</sub>CF<sub>3</sub>)<sub>z</sub>)<sub>n</sub>) with different percentages of 2,2,2-trifluoroethoxy groups were synthesized and found to have a high affinity for VOCs through pervaporation experiments and sorption studies. The pervaporation performance of as-prepared membranes for removal of tetrahydrofuran, acetone and ethanol from water was characterized, in order to study the effect of 2,2,2-trifluoroethoxy pendant group on pervaporation performance. The membranes had better selectivity for THF/water and acetone/water (maximum 30.2 and 24.1, respectively) compared with a polydimethylsiloxane membrane. As the content of 2,2,2-trifluoroethoxy group increased, both selectivity and flux was increased for ethanol/water. However, selectivity for THF/water and acetone/water was decreased. The swelling and sorption experiments of polymers, solubility parameter and diffusivity analysis provide insight into the process.

**Keywords:** Pervaporation performance; Polyphosphazene; Membrane; 2,2,2-Trifluoroethoxy

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