Membranes and theoretical modelling of liquid-gas membrane separation for aromatic compounds removal from water: A review

Abstract

Liquid-gas membrane separation techniques - namely, vacuum membrane distillation, membrane air-stripping/sweeping and pervaporation - are non-equilibrium membrane separation processes emerging for the removal of aromatic compounds from industrial wastewater and polluted ground waters. This review focuses on polymeric hydrophobic membranes which are commonly employed in the liquid-gas membrane separation systems. The effects of chemical properties of the membrane materials on aromatic compounds removals, and better understanding of mass transfer through the membranes are reviewed. The theoretical models of mass transfer through the membranes for the three liquid-gas separation systems are differentiated by pore size and pore size distribution, interactions between the components in feed solutions and membrane materials, and the permeant collector system configurations. Low permeation fluxes and membrane pore wetting are, respectively, challenging tasks for future use of dense membranes and microporous membranes in practical systems.