

Effect of poly(ethylene oxide) on gas permeability and selectivity of organic-inorganic membranes prepared from polyether and IPTS

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Organic-inorganic nanocomposite membranes have been prepared with covalent bonds between organic and inorganic segments. Oligomeric precursors for sol-gel processes were initially prepared by reacting an 3-isocyanatopropyltriethoxysilane (IPTS) and polyethers. The precursor was then submitted to hydrolysis and condensation in the presence of water and acid catalyst. The films were characterized by various techniques in order to study their molecular structure. Composite membranes have been obtained by casting the solution on the microporous polysulfone (PSf) substrate. Single gas permeation measurements and ideal selectivity have been obtained for nitrogen, oxygen, carbon dioxide and methane. The effect of the structure and molecular weight of polyethers and also inorganic material content has been studied in terms of the gas permeability and selectivity. The gas permeability coefficients increase with increasing molecular weight of the polyethers. The higher values of CO₂ permeability coefficients and CO₂/N₂ separation factors are due to the presence of polyether segments.