Composite membranes for CO_2 separation

강상욱†
상명대학교 화학에너지공학과
(swkang@smu.ac.kr†)

CrO_3 particles were synthesized via a thermal reaction at 85 °C using the ionic liquid. Poly(ethylene oxide) (PEO) composite membrane was prepared for CO_2/N_2 separation with CrO_3 particles and BMIM-BF_4. It was expected that the CrO_3 particles could enhance the solubility of CO_2 gas molecules. Furthermore, free imidazolium ions of BMIM-BF_4 played a role as agents for enhancing CO_2 transport. The permeance and selectivity of a PEO membrane without CrO_3 particles were 11.0 gas permeance units (GPU) and 6.5, respectively, while the CO_2 permeance of the composite membrane containing CrO_3 was 144 GPU with selectivity of 30. These results were attributable to the fabricated CrO_3 particles to improve the solubility of CO_2, leading to high efficiency in CO_2/N_2 separation. Thus, the permeance and selectivity increased due to the synergistic effect of the increased CO_2 solubility by chromate esters generated from CrO_3 and the barrier effect on N_2 molecules by particles.