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Ionic Liquid Membranes for CO2 Separation

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Abstract : Membrane separations are mentioned frequently as a possibility for CO2 capture. Selectivity of ionic liquid membranes is strongly determined by different solubility of separated gases in ionic liquids. The solubility of separated gases usually varies over an order of magnitude, differently from diffusivity of gases in ionic liquids, which is usually of the same order of magnitude for different gases. The present work evaluates the selection of an appropriate ionic liquid for the selective membrane preparation based on the gas solubility in an ionic liquid. The current state of the art of CO2 capture patents and technologies based on the membrane separations was considered. An overview is given of the discussed transport mechanisms. Ionic liquids seem to be promising candidates thanks to their tunable properties, wide liquid range, reasonable thermal stability, and negligible vapor pressure. However, the uses of supported liquid membranes are limited by their relatively short lifetime from the industrial point of view. On the other hand, ionic liquids could overcome these problems due to their negligible vapor pressure and their tunable properties by adequate selection of the cation and anion.

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