

334g Mixed Matrix Membranes for CO₂/CH₄ Separation: Plasticization Study on Cellulose Acetate
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Membrane separation is nowadays considered a proven technology widely used in a broad of applications due to its low capital investment and low energy consumption. In natural gas separation process, CO₂ content needs to be reduced to minimize corrosion as well as to maintain a higher heating value of the gas stream. Currently, cellulose acetate membrane is commercially used to remove CO₂ from natural gas. However, due to its limitations such as plasticizing effect, this in turn results in decreasing CO₂/CH₄ selectivity. Recently, mixed matrix membranes (MMMs) were developed to possibly overcome such a limitation. The developed MMMs were composed of adsorbed PEG or DEA onto zeolite or activated carbon. The adsorbed solid was then dispersed in silicone rubber for coating cellulose acetate support. It was found that incorporation of solid and liquid was synergistically effective to improve the separation performance of MMMs. However, the CO₂ plasticization is a concern, therefore, it is the purpose of this work to elaborate and understand such a plasticization phenomenon. Preliminary results obtained from the study are very promising. Detailed information on membrane preparation, gas permeation and selectivity will be discussed at the meeting.