

## **509b Mixed Gas Selectivities and Permeabilities for Carbon Dioxide/Methane Separation Using Room Temperature Ionic Liquid Membranes**

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This talk will expand on the gas separation studies using RTIL-membranes. Previously, we reported on the mixed gas separations of CO<sub>2</sub>/N<sub>2</sub>. This current work will look at carbon dioxide/methane separations. Room Temperature Ionic Liquids (RTILs) are salts that are liquids at room temperatures. RTILs possess a number of unique properties that are useful for liquid membrane separations including high thermal stability, negligible vapor pressure, and non-flammability. Previously, we showed that some RTIL-membranes outperformed standard polymers for the separation of CO<sub>2</sub> from N<sub>2</sub> (for both ideal and mixed gas permeabilities). Now, we report on mixed gas permeabilities and selectivities for the gas pair CO<sub>2</sub>/CH<sub>4</sub>, using a continuous flow of the mixed gas pairs at CO<sub>2</sub> concentrations of at various concentrations between 0% and 100%. The RTIL-membranes tested include the non-facilitated transport membranes, which we previously reported having ideal selectivities/permeabilities. In addition, we report on facilitated transport in RTIL membranes using methylcyclohexylamine (MCHA). A further increase in performance may be realized by the addition of this mobile amine carrier, which can reversibly bind to CO<sub>2</sub>, forming a carbamate.