

David Heldebrant

Seminar: October 13th, 2011 @ 11:30AM

Location: Chernoff Hall, Rm. 211

"Industrial Gas Purifications Using Binding Organic Liquids (BOLs)"

A new solvent-based CO₂ capture process couples the unique attributes of non-aqueous, CO₂-binding organic liquids (CO₂BOLs), with the newly discovered polarity-swing-assisted regeneration (PSAR) process that is unique to switchable ionic liquids. Combining this polarity assist with CO₂BOLs is estimated to provide more than 42% energy savings over the Department of Energy's Estimate for aqueous alkanolamine systems. The PSAR regeneration further reduces temperatures required to regenerate CO₂BOLs (complete CO₂ stripping at 75 °C compared to 120 °C as previously required in a conventional thermal swing). The enhanced regeneration allows for unique energy integration techniques that can further improve process energy savings to more than 65%, such that parasitic load penalties of CO₂ capture would be a fraction of current commercial systems. A key distinction of the technology is that the lower regeneration temperatures of PSAR introduce the economic viability of alternative heat sources rather than using steam from the plant steam cycle. This not only improves the efficiency of the overall process but also simplifies the use of this process as a retrofit to an existing pulverized coal power plant.