

## Potential of Semi-Clathrate Hydrates for Carbon Dioxide Capture

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Semi-clathrate hydrates (sc) are a type of clathrate hydrate in which the guest compound along with water molecules form the host framework and also occupy the cages of the structure. Quaternary ammonium/phosphonium salts such as tetra butyl ammonium bromide (TBAB), tetra butyl ammonium nitrate (TBANO<sub>3</sub>) which form semi-clathrate hydrates have been extensively investigated for cold storage and secondary refrigeration applications. Recently, semi-clathrate hydrates have received attention as promoters for gas separation applications especially for CO<sub>2</sub> separation from fuel or flue gas mixture. In our recent kinetic works, we have identified several distinctive observations of these semi-clathrates applicable to CO<sub>2</sub> capture from pre-combustion streams. In this presentation, we will highlight the advantages and the drawbacks of using quaternary ammonium salts like TBAB and TBANO<sub>3</sub> for carbon dioxide capture based on kinetics of semi-clathrate hydrate formation varying the promoter concentrations and the operating conditions.