235c CO2 Capture Using Amino-Acid Salt Solutions

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In recent years, the stringent environmental regulations towards the emissions of carbon dioxide have considerably changed economics of the fossil fuel fired power plants and the energy industries due to the penalty caused by carbon dioxide emissions. On the other hand, the use of carbon dioxide has become important in enhanced oil recovery programs. It is estimated that there is 20 billion Euro annual markets for CO2 capture alone for fossil fueled power plant in Europe. Alkanolamines based CO2 absorption processes are widely used in the industry for selective and bulk removal of CO2. However, these conventional absorption technologies for CO2 capture are rather energy intensive and adversely affect the economics of many industrial processes. In pursuit of efficient, flexible and compact CO2 capture technologies, new economical regenerative solvents for CO2 capture are required.

In view of higher absorption rates, nonvolatile nature, high loading capacity as well as possible use in membrane contactors, amino acid salt solutions represent a new class of CO¬2 absorption solvents. In the present work, CO2 absorption kinetics for aqueous potassium salt of taurin and glycine is discussed in detail. CO2 absorption into these simple amino acid salt solutions is of biochemical importance for the similarity between CO2 capture by hemoglobin and other proteins present in the blood. This method also represents the biomimetic application of CO2 capture systems to industrial processes. The kinetics measurement of the reaction between CO2 and amino acid salt solution was carried out string of disc gas-liquid model contactor. The measured apparent pseudo first order rate constant was found to be comparable with the reported literature data. . The over all reaction order is found to be 2.5 as opposed to literature reported value of 2. Originally proposed ter-molecular and zwitterion mechanism for alkanolamines is used to explain the reaction kinetics and apparent rate constant. The higher partial reaction order with respect to amino acid salt solution indicates that the intrinsic reaction rate constant may be much lower than that of literature reported value.