Solubility of CO_2 in Aqueous Solutions of 1-Amino-2-Propanol

María E. Rebolledo-Libreros [S], Arturo Trejo [C] and Miguel A. Rebolledo-Morales
Dirección de Investigación y Posgrado, Programa de Ingeniería Molecular, Área de Investigación de Termofísica, Instituto Mexicano del Petróleo, México D.F., México

The absorption technology of acid gases such as CO_2, H_2S, and COS with aqueous solutions of alkanolamines has been widely used in the chemical industries to purify gas mixtures. Particularly, the separation of CO_2 from the flue gas produced by burning fossil fuel has been of great interest due to the global warming caused by the increase in the concentration of CO_2 in the atmosphere. Industrially important alkanolamines are monoethanolamine (MEA), diethanolamine (DEA), *N*-methyldiethanolamine (MDEA), and diisopropanolamine (DIPA). Nonetheless, physicochemical studies should be carried out in order to characterize new and better solvents. Using a dynamic method with recirculation of the vapor phase, experimental data for the solubility of carbon dioxide in aqueous solutions of 1-amino-2-propanol (MIPA) were measured at 313.15 K over the partial pressure range of CO_2 from 0.8 to 2262.6 kPa. The concentrations of aqueous MIPA solutions were 20, 30, 40, and 50 mass %. The results of the gas solubility are given as the partial pressure of CO_2, p_{CO2} against its mole ratio a_{CO2} (mol CO_2/mol MIPA) and its mole fraction, x_{CO2}. The solubilities data of carbon dioxide presented in this work were compared with those in aqueous solutions of alkanolamines such as diethanolamine (DEA) and *N*-methyldiethanolamine (MDEA) and it is possible to conclude that the aqueous solutions of MIPA are an excellent alternative to use in the gas purification processes, since the trend of the solubility results was found to be similar to that in aqueous solutions of MDEA.