

Gas Solubility of CO₂ in Aqueous Solution of n-Methyldiethanolamine and Diethanolamine with 2-Amino-2-Methyl-1-Propanol

M.E. Rebolledo-Libreros^S

Programa de Ingeniería Molecular, Area de Investigación en Termofísica, Instituto Mexicano del Petróleo, México D. F., Mexico

A. Trejo^C

Competencia de Ciencias Básicas, Instituto Mexicano del Petróleo, México D. F., Mexico

For many years it has been a common practice to utilize industrially aqueous solutions of one alkanolamine for the removal of hydrogen sulfide and carbon dioxide, also known as acid gases, from a great variety of hydrocarbon rich gas and liquid streams, such as natural, refinery, and synthesis gases and LPG streams. Recently, the utilization of blends of alkanolamines shows advantages that maximizes the characteristics of the individual alkanolamines, that is, high absorption capacity, low cost of regeneration and to decrease both corrosion and circulation rates. However, reported experimental data on the solubility of CO₂ and H₂S in mixtures of alkanolamines of industrial importance are not plentiful. In this work, gas solubility of carbon dioxide has been measured, using a chromatographic method for analysis of the liquid phase, in aqueous solutions of N-methyldiethanolamine and diethanolamine with 4, 6, and 10 wt % of 2-amino-2-methyl-1-propanol, at 313.15, 343.15, and 393.15 K, over a range of pressure from 3 to 2000 kPa. These data cover the temperature and pressure conditions of the absorption and stripping towers used in gas sweetening processes. The results of the gas solubility are given as the partial pressure of CO₂ against its mol ratio α (mol CO₂/mol alkanolamine) at each temperature studied. Enthalpies of solution of CO₂ have been calculated from the solubility data.