Solubility of H_2S in Aqueous Solutions of 1-Amino-2-Propanol as a Function of Concentration, Pressure, and Temperature

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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 oil and natural gas industries to purify hydrocarbon-rich gas mixtures. 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 results for the solubility of hydrogen sulfide in aqueous solutions of 1-amino-2-propanol (MIPA) were measured at 313.15 and 393.15 K, over the H_2S partial pressure range from 51.4 to 1467.6 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 H_2S, p_{H2S}, against its mole ratio α_{H2S} (mol H_2S/mol MIPA) and its mole fraction, x_{H2S}. The solubility in mole fraction of H_2S was determined with an uncertainty of ± 4 %, whereas an uncertainty of ± 3 % was obtained for α_{H2S}. The physicochemical model of Kent and Eisenberg was used to correlate simultaneously all the experimental results of the solubility of H_2S in the studied aqueous solutions of MIPA. The model correlates satisfactorily the experimental results. The standard deviation for pressure was 68.0 kPa using 69 experimental solubility points. The solubility results of hydrogen sulfide presented in this work were compared with those reported in the literature for aqueous solutions of DEA, DIPA, MDEA, and 2-amino-2-methyl-1-propanol (AMP) and it is possible to conclude that the aqueous solutions of MIPA are a good alternative to use in gas purification processes at high pressures.