Gas Solubility of CO_2 in Aqueous Solutions of *N*-Methyldiethanolamine with 1-Amino-2-Propanol and Diethanolamine with 1-Amino-2-Propanol

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Aqueous solutions of alkanolamines are widely used in industrial processes for sour gas purification, e.g. natural, refinery, and synthesis gas streams, primarily to eliminate acid gases, such as CO_2 and H_2S. Blends of two alkanolamines have been successfully substituted for aqueous solutions of a single alkanolamine. Hence, we study here aqueous blends of a tertiary alkanolamine + primary alkanolamine and a secondary alkanolamine + primary alkanolamine. It is well known that in order to select the most adequate concentration of a mixture of two or more alkanolamines that will efficiently eliminate the acid gases from a given hydrocarbon-rich gas stream, it is of the utmost importance to have a reliable body of solubility data for the acid gases of interest in relatively large ranges of temperature and pressure. In this work gas solubility of carbon dioxide in aqueous solutions of *N*-methyldiethanolamine (MDEA) with 1-amino-2-propanol (MIPA) and diethanolamine (DEA) with MIPA, at different mass ratios with an overall concentration of 50 mass % of alkanolamines have been measured, using a dynamic method with recirculation of the vapor phase, at 313.15 and 343.15 K, over a range of pressure from (0.1 to 3727) kPa. The results of the gas solubility are given as the partial pressure of CO_2 against its mole ratio a_{CO2} (mol CO_2/mol alkanolamine) and its mole fraction at each temperature studied. The solubility in mole fraction of CO_2 in the aqueous solutions was determined with an uncertainty of ± 4 %, whereas an uncertainty of ± 3 % was obtained for a_{CO2}. The solubility of CO_2 in all the systems studied decreases with an increase in temperature, increases with an increase in the partial pressure of CO_2, at a given temperature, and it is a function of the mass ratio of the two alkanolamines in solution.