

REFERENCES

- Aroua, M. K., Haji-Sulaiman, M. Z. & Ramasamy, K. (2002), Modeling of carbon dioxide absorption in aqueous solutions of AMP and MDEA and their blends using Aspen Plus, *Separation and Purification Technology*, **29**: 153-162
- Aroua, M. K. & Salleh, R. M. (2004), Solubility of carbon dioxide in aqueous piperazine and its modeling using the Kent-Eisenberg approach, *Chemical Engineering Technology*, **27(1)**: 65-70.
- Austgen D. M. (1989), A model of vapour-liquid equilibria for acid gas-alkanolamine-water systems, Ph.D. Dissertation, The University of Texas at Austin.
- Austgen, D. M., Rochelle, G. T. & Chen, C.C. (1991), Model of vapour-liquid equilibria for aqueous acid gas-alkanolamine systems-2-, *Industrial Engineering and Chemistry Research*, **30(3)**: 543-555
- Baek, J. & Yoon, J. (1998), Solubility of carbon dioxide in 2-amino-2-methyl-1,3-propanediol, *Chemical and Engineering Data*, **43(4)**: 635-637
- Baek, J., Yoon, J., & Eum H. (2000), Prediction of equilibrium solubility of carbon dioxide in aqueous 2-amino-2-methyl-1,3-propanediol solutions, *Korean Journal of Chemical Engineering*, **17(4)**: 484-487
- Barth, D., Tondre, C. & Delpuech, J. J. (2005), Stopped-flow determination of carbon dioxide-diethanolamine reaction mechanism: Kinetics of carbamate formation, *International Journal of Chemical Kinetics*, **15(11)**: 1147-1160.
- Bavbec, O. & Alper, E. (1999), Reaction mechanism and Kinetics of Aqueous solutions of secondary alkanolamines and carbon dioxide, *Turk Journal Chem.* **23**: 293-300
- Benamor, A. (1998), Solubility of carbon dioxide in aqueous solutions of DEA and MDEA and their mixtures, M.Sc. Thesis, University of Malaya.
- Benamor, A., & Aroua M. K. (2005), Modeling of CO₂ solubility and carbamate concentration in DEA, MDEA and their mixtures using Deshmukh-Mather model, *Fluid Phase Equilibria* **231(2)**, 150-162
- Bishnoi, S. (2000), Carbon dioxide absorption and solution equilibrium in piperazine activated methyldiethanolamine, Ph.D. Dissertation, University of Texas at Austin, Austin, TX
- Bishnoi, S. & Rochelle, G. T., (2000), Physical and chemical solubility of carbon dioxide in aqueous methyldiethanolamine, *Fluid Phase Equilibria*, **168**: 241-258.
- Blauwhoff P. M., Versteeg, G. F. and Swaaij W. P. (1984), A study on the reaction between CO₂ and alkanolamines in aqueous solutions, *Chemical Engineering Science*, **39(2)**: 207-225
- Caplow, M. (1968) Kinetics of carbamate formation and breakdown, *Journal of American Chemical Society*, **51(24)**: 4005-4008

- Cents A. , Brilman, D., Versteeg, G. (2005), Gas absorption in an agitated gas-liquid-liquid system, *Chemical Engineering Science*, **56**: 1075-1083
- Cents A. , Brilman, D., Versteeg, G. (2005a), CO₂ absorption in carbonate/bicarbonate solutions: The Dankwerts-criterion revisited, *Chemical Engineering Science*, **60**: 5830-5835.
- Chakma A. & Meisen A. (1987) Degradation of aqueous DEA solution in heat transfer tube, *The Canadian Journal of Chemical Engineering*, **65**: 264-273
- Chakravarty, T., Phukan, U. K. and Weiland, R. H. (1985) Reaction of acid gases with mixtures of amines, *Chemical Engineering Prog.* **81**: 32-36
- Chen, C. C. & Evans, L. B. (1986), A Local composition model for the excess Gibbs free energy of aqueous electrolyte systems, *AIChE Journal*, **32(3)**: 444-445
- Daneshvar, N., Zaaferani, M., Abedinzadegan, A., & Soheil, S. (2009), The equilibrium solubility of carbon dioxide in the mixed aqueous solutions of triisopropanolamine and monoethanolamine in the range of 30-70 °C and low partial pressure, *Iranian Journal of Chemistry and Chemical Engineering*, **23(1)**: 109-115.
- Dang H., Rochelle G. T., (2001), CO₂ Absorption rate and solubility in monoethanolamine/piperazine/water, *Proceedings for the First National Conference on Carbon Sequestration*, Washington, DC, May 14-17, 2001.
- Dankwerts, P. V. (1979) The reaction of carbon dioxide with ethanolamine, *Chemical Engineering Science*, **34(4)**: 443-446
- Dankwerts, P. V. & McNeil, K. M. (1967), The absorption of carbon dioxide into aqueous amine solutions, and the effects of catalysis. *Trans Institution of Chemical Engineers*, **45**: T31
- Dankwerts P. V. & Sharma, M. M. (1966) Absorption of carbon dioxide into solutions of alkalis and amines hydrogen sulphide and carbonyl sulphide, *Chemical Engineer*, **202**: 1904-1920
- daSilva, E. (2005), Computational chemistry study of solvents for CO₂ absorption, Ph.D. Thesis, Norwegian University of Science and Technology, Trondheim, Norway.
- daSilva, E., & Svendsen, H. (2004), Chemistry of CO₂ absorption in amine solutions studied by computational chemistry, Norwegian University of Science and Technology.
- Derks, P. W. J. (2006), Carbon dioxide absorption in piperazine activated N-methyldiethanolamine, PhD thesis, University of Twente, The Netherlands
- Derks P., Hogendoorn, J., & Versteeg, G. (2010), Experimental and theoretical solubility of carbon dioxide in aqueous blends of piperazine and N-methyldiethanolamine, *Journal of Chemical Thermodynamics*, **42**: 151-163
- Deshmukh, R. & Mather, A. (1981), A mathematical model for equilibrium solubility of hydrogen sulfide and carbon dioxide in aqueous alkanolamine solutions, *Chemical Engineering Science*, **36**: 355-362.

- Dugas R., Hillard M., Rochelle, G. T., (2007), Kinetics and thermodynamics of 7 m MEA and 7 m MEA/2 m PZ solutions, Poster presentation at the 6th Annual Conference on Carbon Capture and Sequestration, Pittsburgh, PA, May 2007.
- Du Part M. S., Bacon T. R. & Edwards D. J., (1993), Understanding corrosion in alkanolamine gas treating plants, *Hydrocarbon Processing*, April 1993: 75-80.
- Edwards, T. J. Maurer, G., Newman, J., & Prausnitz, J. M. (1978), Vapour-liquid equilibria in multicomponent aqueous solutions of volatile weak electrolytes, *AIChE J.*, **24** (6), 966-976.
- Esber G. S. (2006), Carbon dioxide capture technology for the coal-powered electricity industry: A systematic prioritization of research needs, M.Sc. Thesis Technology and Policy, MIT, Massachusetts, USA.
- Green D. A., Turk, B. S., Portzer, J. W., Nelson, T. & Gupta, R. P. (2005), Carbon dioxide capture from flue gas using dry regenerable sorbents, quarterly technical progress report, DOE, OSTI, Information Bridge: Scientific and Technical Information, Oct. 1-Dec. 31 2004.
- Haji-Sulaiman, M. Z., Aroua, M. K., & Pervez M. I. (1996), Equilibrium concentration profiles of species in CO₂-alkanolamine-water systems, *Gas Separation and Purification*, **10** (1), 13-18
- Herzog, H. & Golomb, D. (2004), Carbon capture and storage from fossil fuel use, *Encyclopedia of Energy*, Elsevier, Article No. NRGY: 00422.
- Hook, R. (1997), An investigation of some sterically hindered amines as potentially carbon dioxide scrubbing compounds, *Industrial Engineering Chemistry Research*, **36**, 1779-1790
- Hosseini, A. (2009), Carbon dioxide absorption using aqueous mixtures of 2-amino-2methyl-1-propanol and 1-butyl-3-methylimidazolium trifluoroacetate, M.Sc. Thesis, University of Malaya.
- Hu, W. & Chakma, A. (1990), Modeling of Equilibrium Solubility of CO₂ and H₂S in aqueous DGA Solutions, *Canadian Journal of Chemical Engineering*, **68**: 523
- Huang, H., Shi, Y., Li, W. & Chang, S. (2000), Dual alkali approaches for the capture and separation of CO₂, Environmental Energy Division, Lawrence Berkeley National Laboratory, University of California
- Iijima, M., Ishida, K., Kamijo, T., Mimura, T., Yagi, Y, Yonekawa, T., Yoshiyama, R. (2004), Improvements of carbon dioxide capture technology from flue gas, Presented at the 7th International Conference on Greenhouse Gas Technologies, Sept. 5-9, 2004, Vancouver, Canada.
- Jou, F. Y., Mather, A. E. & Otto, F. D. (1995), The solubility of CO₂ in a 30 mass percent monoethanolamine solution, *The Canadian Journal of Chemical Engineering*, **73**(1): 140–147.
- Jou, F. Y., Mather, A. E., Otto, F. D., (1982), Solubility of H₂S and CO₂ in aqueous methyldiethanolamine solutions, *Industrial and Engineering Chemistry Process Design and Development*, **21**: 539-544

- Kent R. & Eisenberg, B. (1976), Better data for amine treating, *Hydrocarbon Processing*, **55**: 87-90
- Kohl, A. L. & Nielsen, R. B. (1997), Gas Purification, 5th Edition, Gulf Professional Publishing Co. Houston, TX.
- Kim, I., Hoff, K., Hessen, E., Warberg, T. & Svendsen, H. (2009), Enthalpy of absorption of CO₂ with alkanolamine solutions predicted from reaction equilibrium constants, *Journal of Chemical Engineering Data*, 64:2027-2038
- Laddha, S. S., Danckwerts, P. V., (1981), Reaction of CO₂ with ethanolamines: kinetics from gas-absorption. *Chemical Engineering Science* **36**: 479-482
- Lee J. I., Otto F. D., Mather A. E. (1976), The measurement and prediction of the solubility of mixtures of carbon dioxide and hydrogen sulphide in 2.5N monoethanolamine solutions, *Canadian Journal of Chemical Engineering*, **54**: 214
- Li, Y. G. & Mather, A. E. (1994), Correlation and prediction of carbon dioxide in a mixed ethanolamine solution, *Industrial Engineering and Chemistry Research*, **33**: 2006-2015
- Li, Y. G. & Shen K. P., (1992), Densities and solubilities of solutions of carbon dioxide in water + monoethanolamine + methyldiethanolamine. *Journal of Chemical Engineering Data*, 37: 288
- Littel, R., Bos, M. & Knoop G.J. (1990), Dissociation constants of some alkanolamines at 293, 303 318 and 333, *Journal of Chemical and Engineering Data*, **35(3)**: 276-277
- Ma'mun, S., Nielsen, R., Hallvard F. & Svendsen, H. (2004), Solubility of CO₂ in 30% MEA and 50% MDEA solutions,
- Mamun, S. (2005), Selection and characterization of new absorbents for carbon dioxide capture, Ph.D. Thesis, Department of Chemical Engineering, Norwegian University of Science and Technology, Norway.
- Mandal B.P., Guha M., Biswas A. K., & Bandyopadhyay S. S., (2002), Removal of carbon dioxide by absorption in mixed amines: modeling of absorption in aqueous MDEA/MEA and AMP/MEA solutions, *Chemical Engineering Science*, **56**: 6217-6224.
- Mandal, B. P., Biswas, A. K. & Bandyopadhyay, S. S. (2003), Absorption of carbon dioxide in aqueous blends of 2-amino-2-methyl-1-propanol and diethanolamine, *Chemical Engineering Science*, **58**: 4137-4144
- Mandal, B. P., Biswas, A. K. & Bandyopadhyay, S. S. (2005), Simultaneous absorption of CO₂ and H₂S into aqueous blends of AMP and DEA, *Chemical Engineering Science*, **60(22)**: 6438-6451.
- Mimura, T., Simayoshi, H., Suda, T., Ijima, M. & Mituoka, S. (1997), Development of energy saving technology for flue gas carbon dioxide recovery in power plant by chemical absorption method and steam system, *Energy Conservation and Management*, **38**: 57-62

- Mimura, T., Simayoshi, H., Suda, T., Iwaki, A., Honda, A. & Kumazawa, H. (1998), Kinetics of reaction between carbon dioxide and sterically hindered amines for carbon dioxide recovery from power plant flue gases, *Chemical Engineering Communications*, **170**(1): 245-260.
- Ohno, K., Inoue, Y., Yoshida, H. & Matsuura H. (1999), Reactions of aqueous 2-(methylamino) ethanol solutions with carbon dioxide. Chemical species and their conformations studied by vibrational spectroscopy and ab initio theories, *Journal of Physical Chemistry A*, **103**(21): 4283-4292.
- Olofsson, G., & Hepler, L. G. (1975), Thermodynamics of ionization of water over wide ranges of temperature and pressure, *Journal of Solution Chemistry*, **4**: 127-143.
- Park, J., Yoon, S. & Lee, H. (2003), Effect of steric hindrance on carbon dioxide absorption into new amine solutions: Thermodynamic and spectroscopic verification through solubility and NMR analysis, *Environmental Science and Technology*, **37**(8): 1670-1675.
- Patil, P., Malik, Z., & Jobson, M. (2006), Prediction of CO₂ and H₂S solubility in aqueous MDEA solutions using an extended Kent and Eisenberg model, Proceedings of the Distillation and Absorption Conference, IChemE, Warwickshire, UK: 498-510.
- Pitzer, K. S. (1991), Ion interaction approach theory and data correlation in activity coefficients in electrolyte solutions, 2nd Edition, CRC Press. Boca Raton, FL.
- Rahimpour M. R. & Kashkooli, A. Z. (2004), Modeling and simulation of industrial carbon dioxide absorber using amine-promoted potash solution, *Iranian Journal of Science and Technology, Transaction B*, 28(B6): 653-666
- Sardar, H. & Weiland, R. H. (1984), A non-equilibrium stage approach to the design and simulation of gas treating units, AIChE, San Francisco, CA.
- Sartori, G. & Savage, D. W. (1983), Sterically hindered amines for carbon dioxide Removal from gases, *Industrial Engineering Fundamentals*, **22**(2): 239-249.
- Shaw, T.P., & Hughes P.W. (2001). Optimize CO₂ removal, *Hydrocarbon Processing*. **May**: 53-58.
- Si Ali, B. (2007), Carbon dioxide absorption and its corrosivity in aqueous solutions of activated diethanolamine and methyldiethanolamine, Ph.D. Dissertation, University of Malaya, Malaysia.
- Si Ali, B., & Aroua M. K. (2004), Effect of piperazine on CO₂ loading in aqueous solutions of MDEA at low pressure, *International Journal of Thermophysics*, **25**: 1863-1870.
- Strazisar, B. R., Anderson, R. R. & White, C. M., Degradation Monoethanolamine Used in Carbon Dioxide Capture from Flue Gas of a Coal-fired Electric Power Generating Station, *National Energy Technology Laboratory, Clean Energy Devision*.
http://www.netl.doe.gov/publications/proceedings/01/carbon_seq/4b3.pdf
- Thitakamol B., Veawab A. & Aroonwilas, A. (2007), Environmental impacts of absorption-based CO₂ capture unit for post-combustion treatment of flue gas

from coal-fired power plant, *International Journal of Greenhouse Gas Control*, **1**: 312-342

Tourneux, D. L. (2007), Absorption of carbon dioxide in aqueous solutions of 2-amino-2-hydroxymethyl-1,3-propanediol, M.Sc. Thesis, Université Laval, Québec, Canada.

Veawab, A., Aroonwilas, A., Chakma, A. & Tontiwachwuthikul, P. (2001), Solvent formulation for CO₂ separation from flue gas streams. First National Conference on Carbon Sequestration, Washington, DC, May 15-17.

Versteeg G. F. & Van Swaaij W. P. M. (1987), On the kinetics between CO₂ and alkanolamines both in aqueous and non-aqueous solutions-I. Primary and secondary amines. *Chemical Engineering Science* **43**: 573-585

Wong S. & Bioletti R. (2002), Carbon Dioxide Separation Technologies. Carbon & Energy Management, Alberta Research Council Inc.: Edmonton, Alberta.

Weiland R. H., Chakravarty, T., & Mather, A. E. (1993), Solubility of carbon dioxide and hydrogen sulphide in aqueous alkanolamines, *Industrial Engineering Chemistry Research*, **32**: 14-19

www.chemicalbook.com

www.chemicalland.com