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Appendix – A

Figures

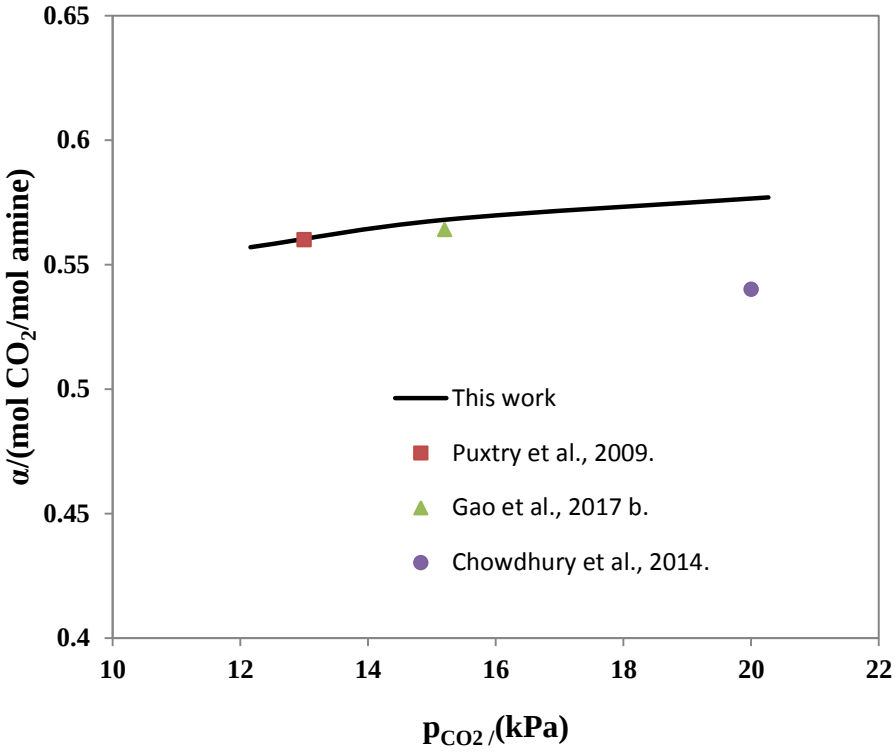

Figure A1. Comparision of experimental data and literature data of CO_2 solubility (mol CO_2/mol amine) for 30 wt. % aqueous MEA at 313.15 K temperature and CO_2 partial pressure of 12.16, 15.20, and 20.27 kPa.

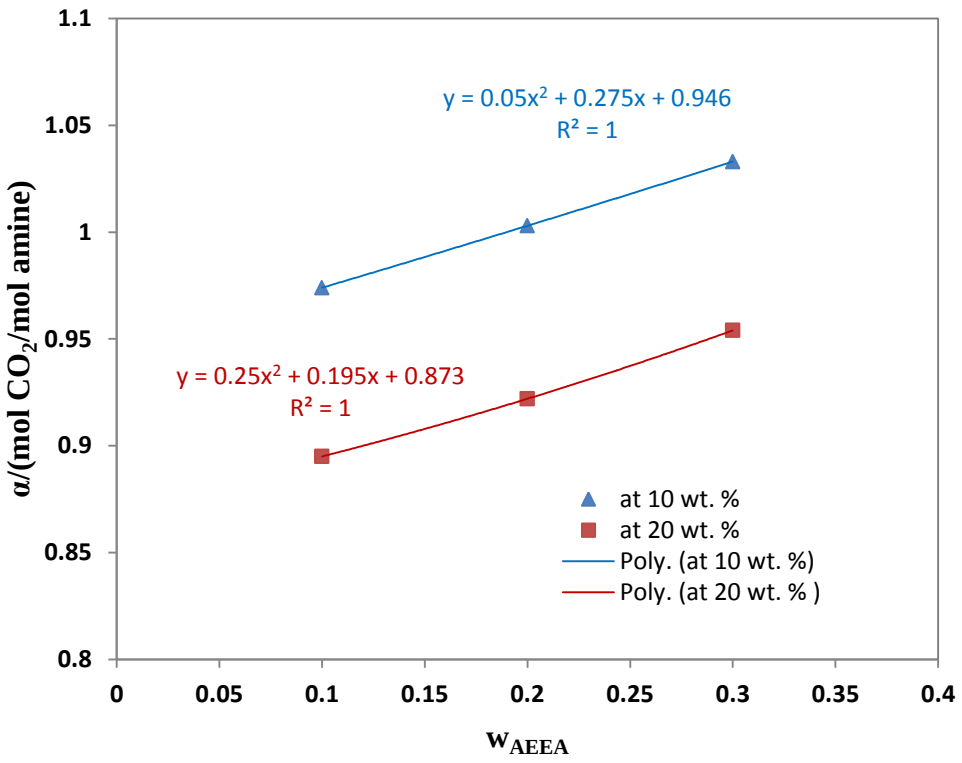

Figure A2. Effect of AEEA weight fraction (w_{AEEA}) on the CO_2 solubility at 298.15 K temperature and 20.27 kPa partial pressure of CO_2 gas for the EAE and AEEA blend, lines (—) are for polynomial trend line.

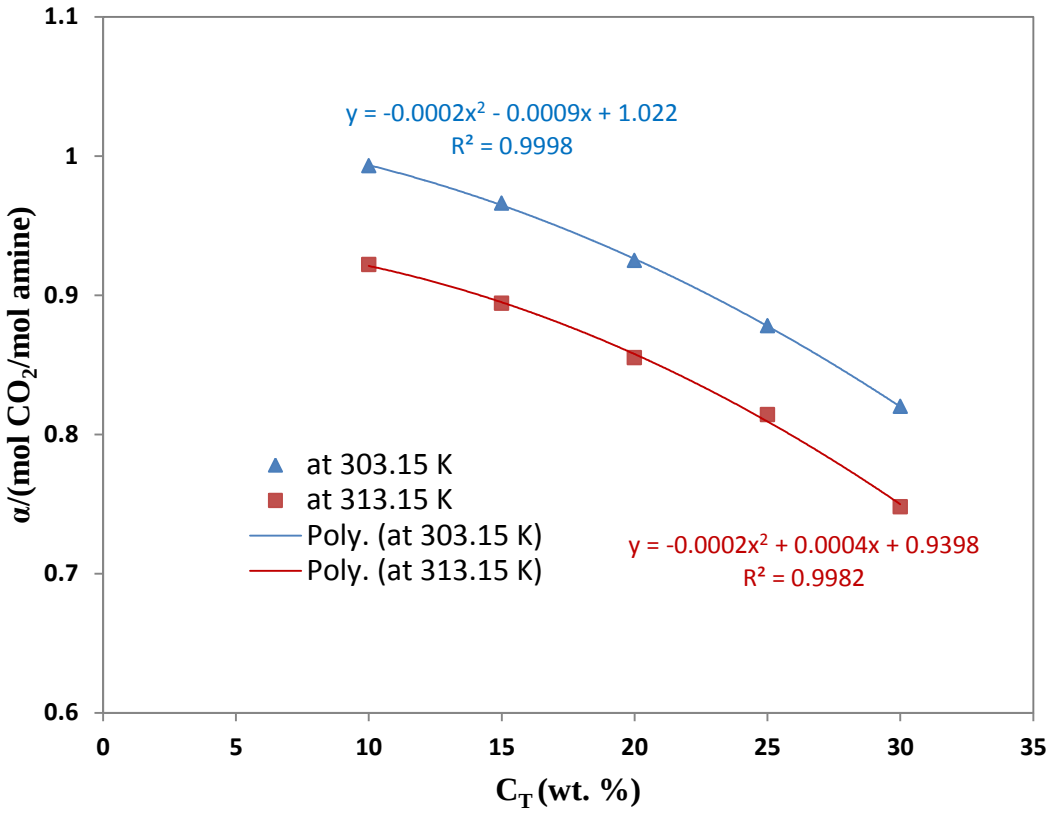

Figure A3. Effect of total concentration (C_T) of the aqueous EAE and AEEA blend with 0.30 w_{AEEA} and at 15.20 kPa partial pressure of CO_2 on the CO_2 solubility, lines (─) are for polynomial trend line.

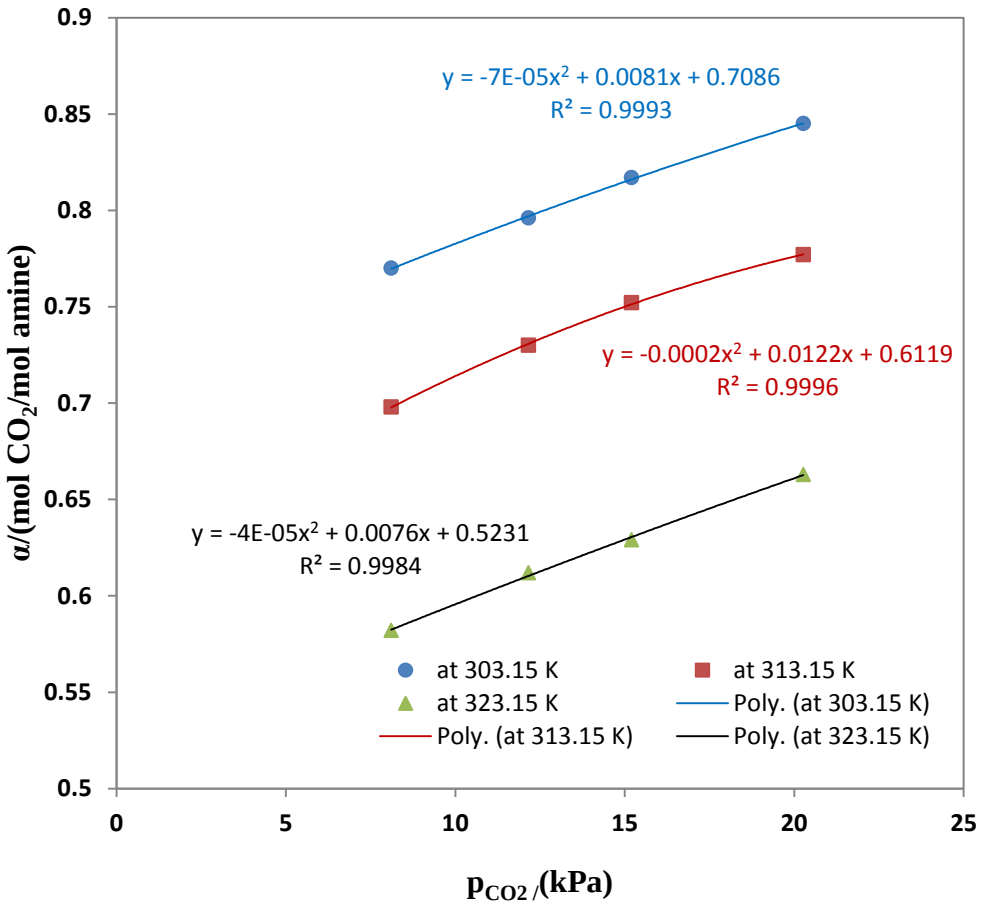

Figure A4. Effect of CO_2 partial pressure on the CO_2 solubility for the 30 wt. % (21 wt. % + 9 wt. %) aqueous EAE and AEEA blend, lines (─) are for polynomial trend line.

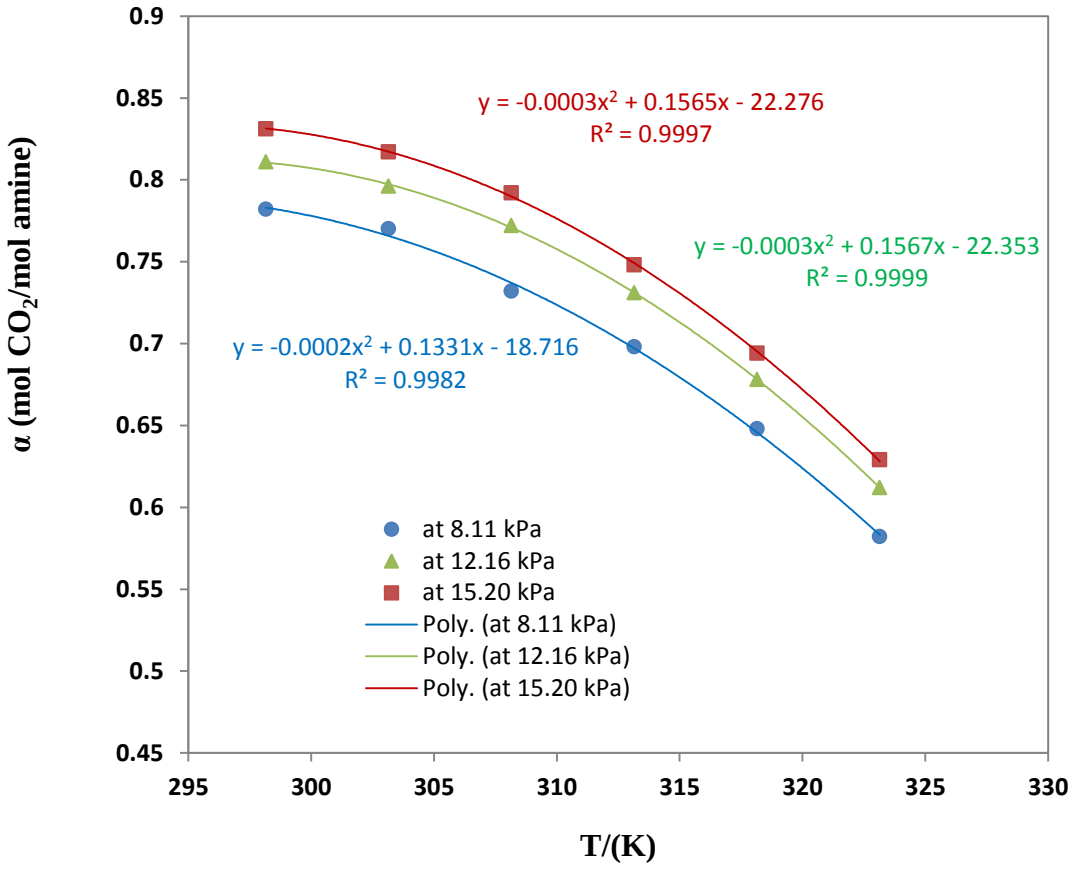

Figure A5. Effect of temperature on the CO_2 solubility for the 30 wt. % (21 wt. % + 9 wt. %) aqueous EAE and AEEA blend, lines (─) are for polynomial trend line.

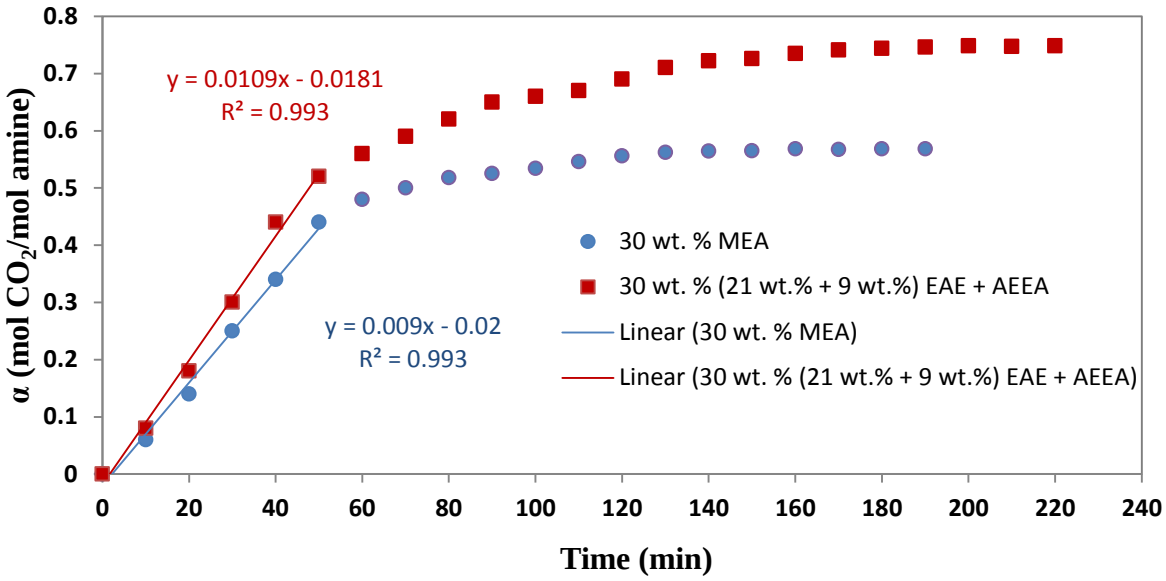

Figure A6. CO_2 solubility vs. time plot of 30 wt. % MEA and 30 wt. % (21 wt. % + 9 wt. %) aqueous EAE and AEEA blend during CO_2 absorption, lines (─) are for linear trend line.

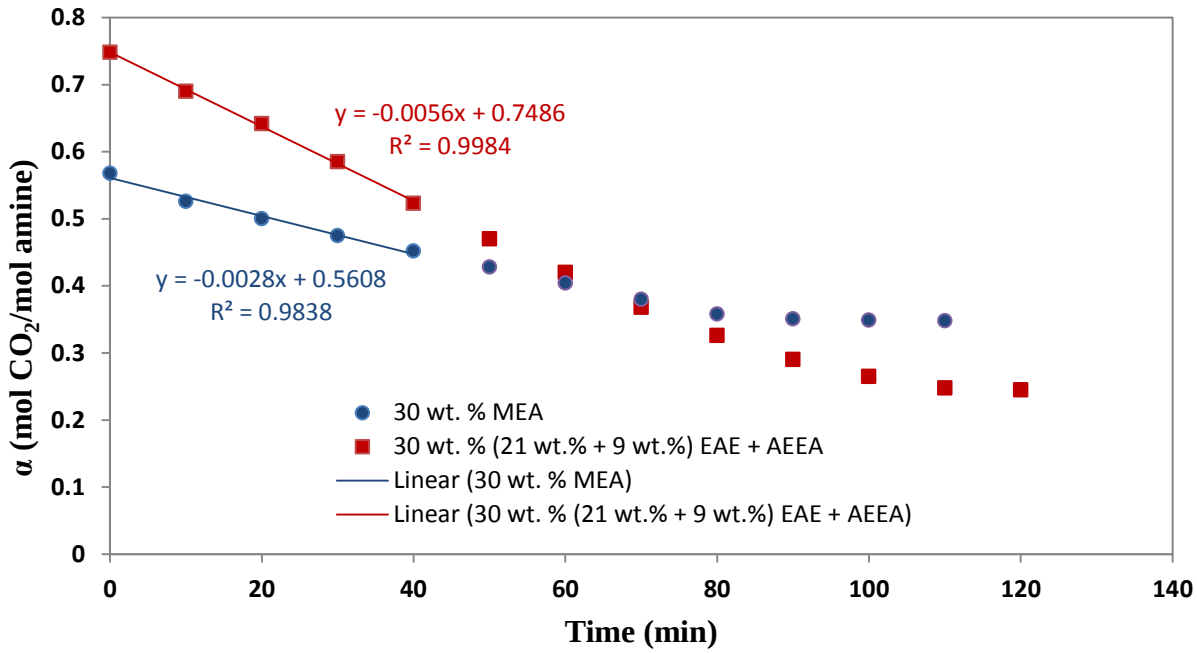

Figure A7. CO_2 solubility vs. time plot of 30 wt. % MEA and 30 wt. % (21 wt. % + 9 wt. %) aqueous EAE and AEEA blend during CO_2 desorption, lines (─) are for linear trend line.

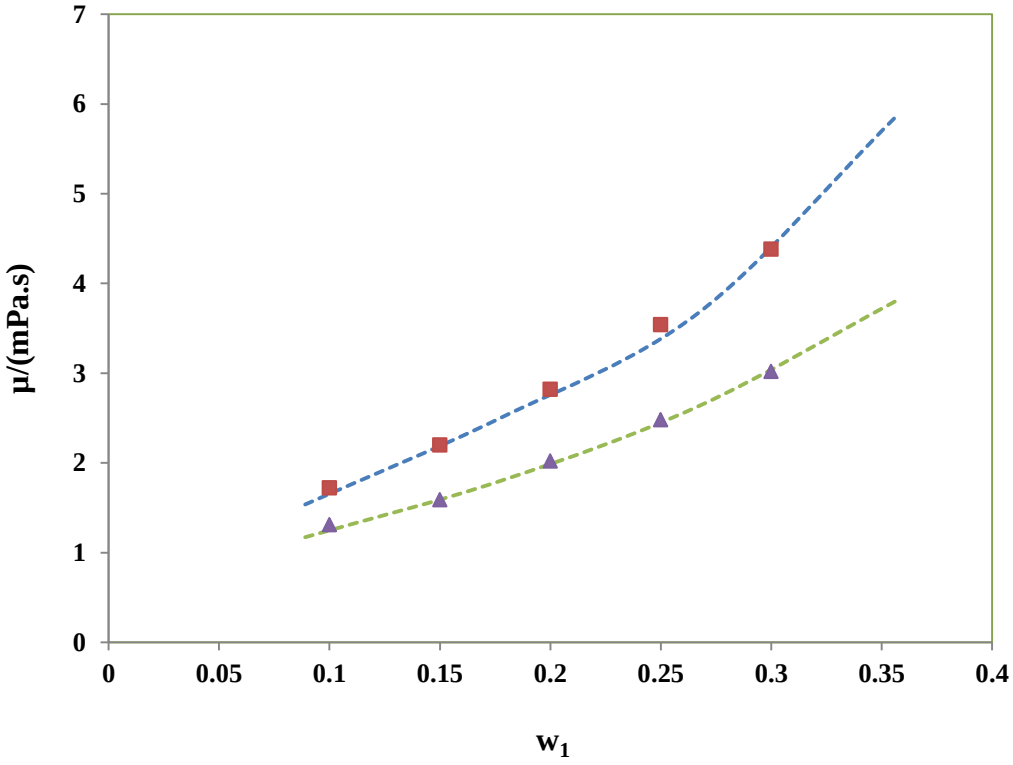

Figure A8. Viscosity of EAE + H_2O versus weight fraction of EAE (w_1) at different temperature (T), T: ■ 293.15 K; ▲ 303.15 K; dashed lines are for corresponding available literature data (Gao et al., 2017 a).

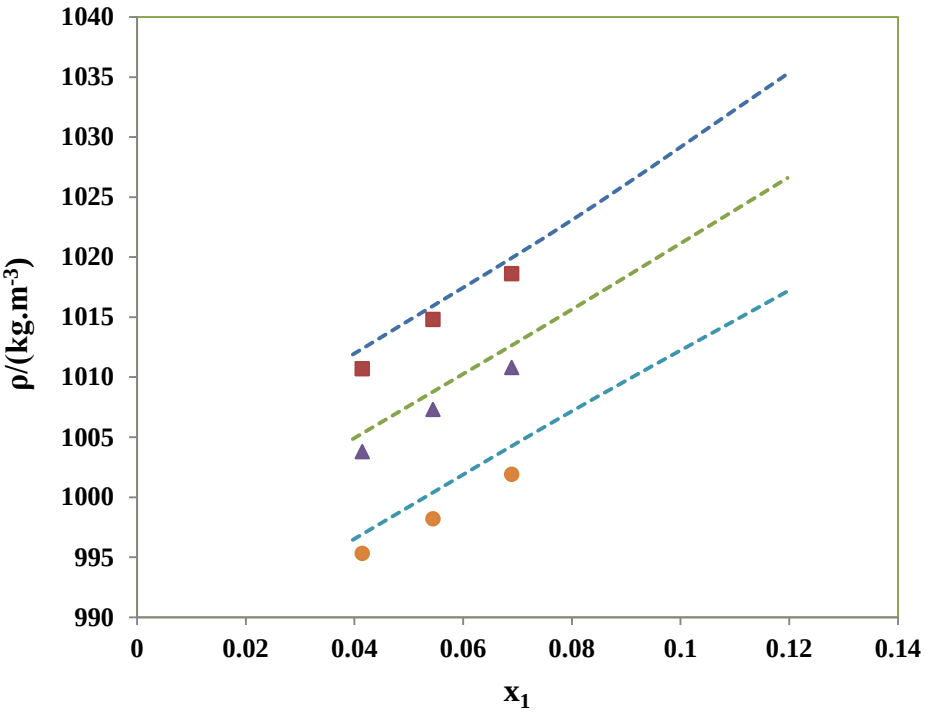

Figure A9. Density of AEEA + H_2O versus mole fraction of AEEA (x_1) at different temperature (T), T: ■ 298.15 K; ▲ 313.15 K; ● 328.15 K; dashed lines are for corresponding available literature data (Stec et al., 2014).

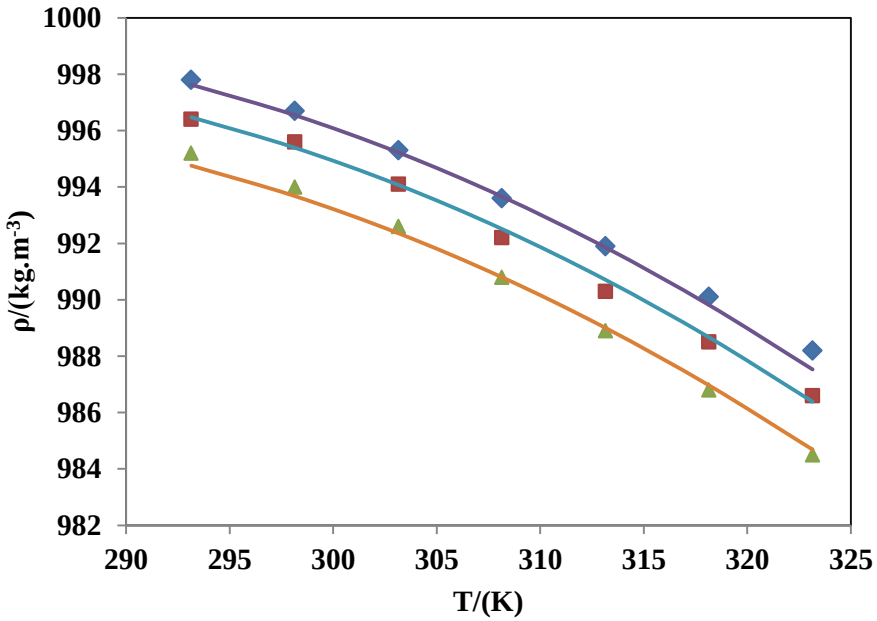

Figure A10. Density of aqueous EAE+AEEA blend versus temperature for different concentration (in weight fraction) of EAE+AEEA, w: for (♦) 0.10; (■) 0.20; (▲) 0.30; and lines (—) for calculated values with Eq. 5.6.

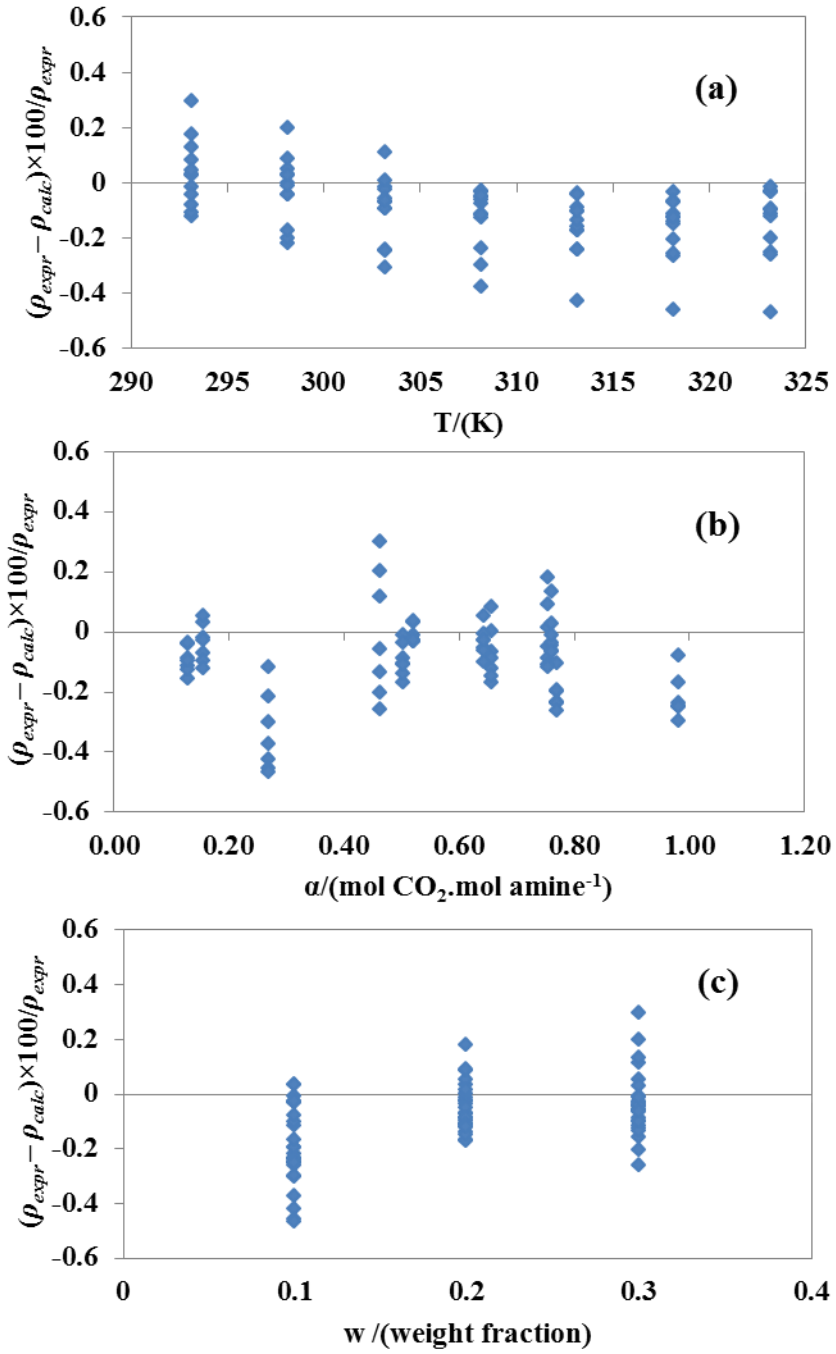

Figure A11. Relative deviations of experimental and calculated density data of CO_2-loaded aqueous EAE +AEEA blend from Eq. 5.7 as a function of **(a)** temperature, **(b)** CO_2 loading, and **(c)** concentration (EAE+AEEA weight fraction).

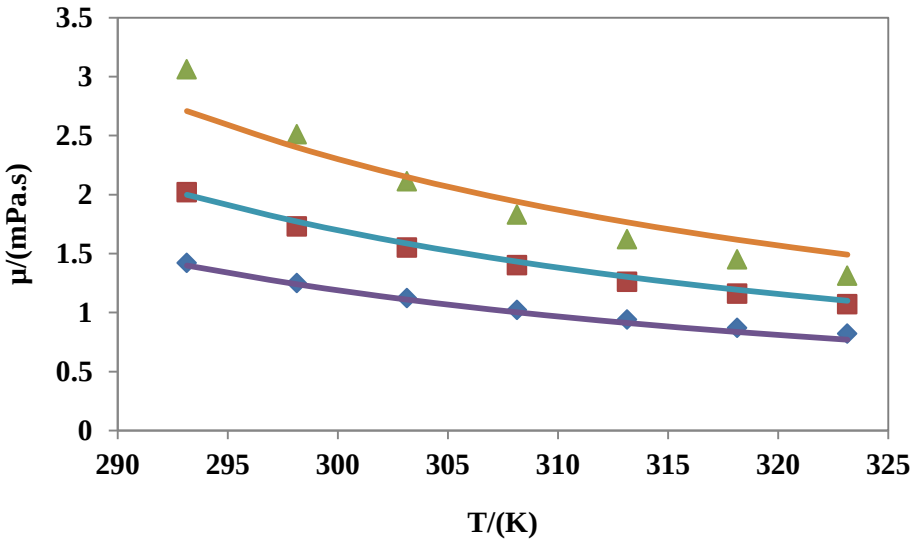

Figure A12. Viscosity of aqueous EAE+AEEA blend versus temperature for different concentration (in weight fraction) of EAE+AEEA, w: for (♦) 0.10; (■) 0.20; (▲) 0.30; and lines (—) for calculated values with Eq. 5.9.

Appendix-B

Table B1. Values of fitting parameters of Eq. 4.13.

w_1	a	$b\times10^6$	$c\times10^6$
		EAE+H_2O	
0.05	-6.6244	-2192.38	4.19
0.10	-6.5920	-2422.62	4.61
0.15	-6.5842	-2501.77	4.80
0.20	-6.5786	-2563.91	4.96
0.25	-6.6905	-1863.27	3.89
0.30	-6.7505	-1526.15	3.45
		AEEA+H_2O	
0.05	-6.6602	-1984.25	3.87
0.10	-6.6457	-2115.88	4.11
0.15	-6.6674	-2019.14	3.99
0.20	-6.6576	-2132.63	4.22
0.25	-6.6698	-2114.59	4.25
0.30	-6.6930	-2026.69	4.17
w_1+w_2		EAE + AEEA + H_2O	
		w_1(EAE)/w_2(AEEA) = 9/1	
0.10	-6.7574	-1258.91	2.58
0.20	-6.6626	-1900.96	3.68
0.30	-6.2281	-2144.51	4.08
		w_1(EAE)/w_2(AEEA) = 8/2	
0.10	-6.7391	-1371.07	2.75
0.20	-6.7339	-1444.19	2.95
0.30	-6.6678	-1864.50	3.64
		w_1(EAE)/w_2(AEEA) = 7/3	
0.10	-6.7661	-1202.68	2.48
0.20	-6.7739	-1159.79	2.44
0.30	-6.6298	-2107.15	4.01

Publications

Publications in Science Citation Indexed (SCI) Journals

1. **Diwakar Pandey** and Monoj Kumar Mondal, Thermodynamic modeling and new experimental CO_2 solubility into aqueous EAE and AEEA blend, heat of absorption, cyclic absorption capacity and desorption study for post-combustion CO_2 capture, *Chemical Engineering Journal (Elsevier Publication)*, **(2021)**, 410, 128334. **Impact factor: 10.652**

2. **Diwakar Pandey** and Monoj Kumar Mondal, Experimental data and modeling for density and viscosity of carbon dioxide (CO_2)-loaded and -unloaded aqueous blend of 2-(ethylamino)ethanol (EAE) and aminoethylethanolamine (AEEA) for post-combustion CO_2 capture, *Journal of Molecular Liquids (Elsevier Publication)*, **(2021)**, 330, 115678. **Impact factor: 5.065**

3. **Diwakar Pandey** and Monoj Kumar Mondal, Viscosity, density, and derived thermodynamic properties of aqueous 2-(ethylamino)ethanol (EAE), aqueous aminoethylethanolamine (AEEA), and its mixture for post-combustion CO_2 capture, *Journal of Molecular Liquids (Elsevier Publication)*, **(2021)**, Article in press, Available online on 9th March 2021, 115873 . **Impact factor: 5.065**

4. **Diwakar Pandey** and Monoj Kumar Mondal, Equilibrium CO_2 solubility in the aqueous mixture of MAE and AEEA: Experimental study and development of modified thermodynamic model, *Fluid Phase Equilibria (Elsevier Publication)*, **(2020)**, 522, 112766. **Impact factor: 2.838**

5. **Diwakar Pandey** and Monoj Kumar Mondal, Experimental data and modeling for viscosity and refractive index of aqueous mixtures with 2-(methylamino)ethanol

(MAE) and aminoehtylethanolamine (AEEA), *Journal of Chemical & Engineering Data (ACS Publication)*, **(2019)**, 64, 3346-3355. **Impact factor: 2.369**

Workshop attended and paper presented in conferences

- Participated in a workshop on "Inclusion in Smart city Planning of India of Renewable energy & Energy efficiency (InSPIRE) held on 25th March 2017 at IIT (B.H.U.) Varanasi.

- **Diwakar Pandey** and Monoj Kumar Mondal, "CO_2 solubility studies in an aqueous blend of diethylethanolamine and trisodium phosphate." in CHEMCON-2018 (International Conference), held at NIT Jalandhar during December 27-30, 2018.

- **Diwakar Pandey,** Shailesh Kumar and Monoj Kumar Mondal "Absorption of carbon dioxide in aqueous blend of dimethylethanolamine and aminoethylethanolamine" in the national conference on "Recent Trends in Chemical Engineering and Environmental Protection" held at B.I.E.T. Jhansi on March 30,2019.