Supplementary Information

Thermophysical Behaviour of Carbonated Aqueous Solutions Containing Monoethanolamine and Degradation Products

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Properties of pure HEIA

The vapour pressures of HEIA measured in this work in the temperature range of 424.45 K to 442.55 K are shown and plotted against reciprocal temperature in Table S1 and **Error! Reference source not found.** respectively. The low vapour pressures observed indicate that HEIA is counted as a heavy product of low volatility. The enthalpy of vaporisation of HEIA, obtained from experimental data regression, is 139 kJ·mol^{-1}, which is much higher than that of water, MEA and other amines.

Table S1. HEIA vapour pressure in its equilibrium temperature [a].

P (Pa)	Temperature (K)
26.66	424.45
66.66	433.95
133.32	442.55
ΔH_{vap} (kJ mol^{-1})	139

[a] Expanded uncertainties at 95% are U (*T*)= 1 and Ur (*P*) = 0.0015·*P*.

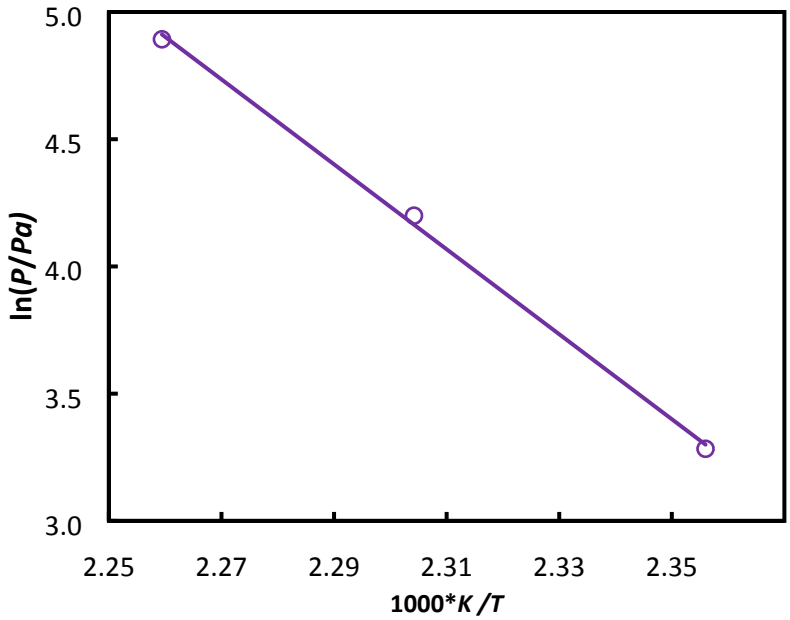

Figure S1. HEIA vapour pressure in a Clausius-Clapeyron plot.

Calculated deviations of correlated properties from experimental measurements

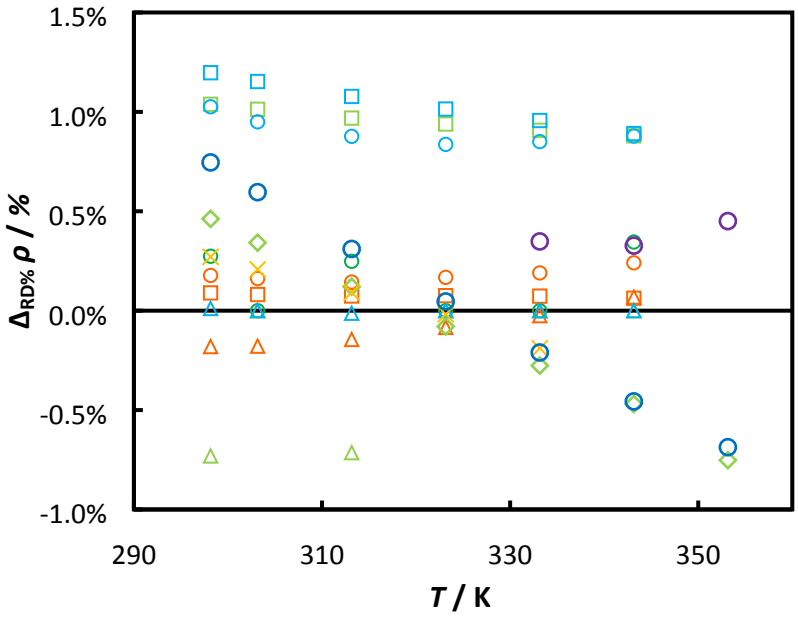

Figure S2. Deviations of experimental densities ρ of this work and calculated based on Weiland and modified Weiland Correlations (Eqs. 1 and 4, parameters from Table 10 and 11) of MEA at 30%wt (orange) and MEA-HEIA blends at [HEIA] 7%wt (green) and 14mass% (light blue): □, unloaded; ○, half loaded; Δ, full loaded; HEIA and aqueous HEIA at: 100%wt (violet) ○; 73%wt (blue) ○; 49%wt (green) ◇; 24%wt (orange) ×.

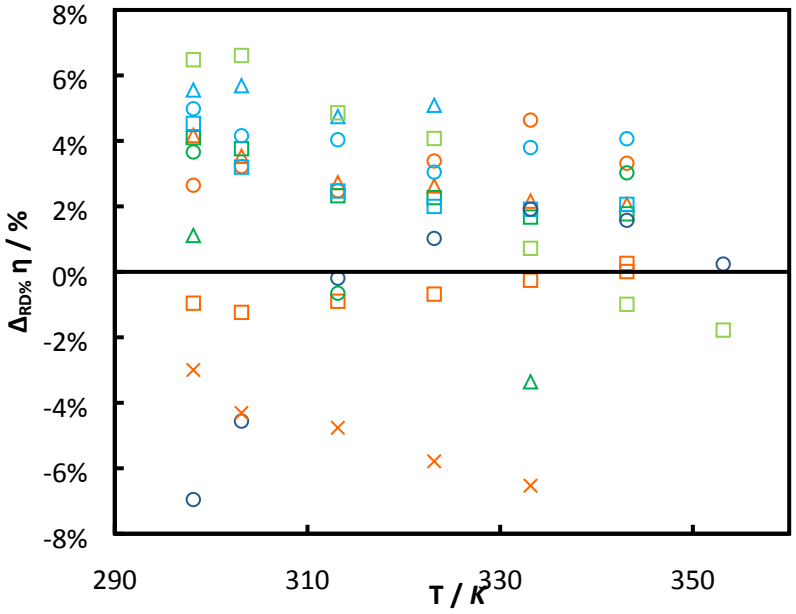

Figure S3. Deviations of experimental viscosities of this work and calculated based on Weiland and modified Weiland's correlations (Eqs. 12 and 13 with parameters from Tables 12 and 13) of MEA at 30%wt (orange); MEA-HEIA blends at [HEIA] 7%wt (green) and 14mass% (light blue): □, unloaded; ○, half loaded; Δ, full loaded; and aqueous HEIA at: 73%wt (blue) ○; 49%wt (green) ◇; 24%wt (orange) ×.

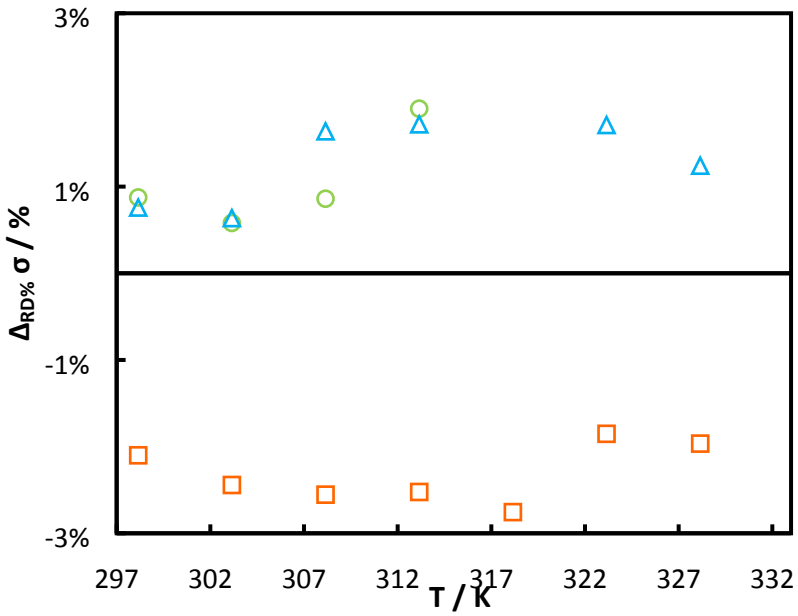

Figure S4. Deviations of experimental surface tensions of this work and calculated based on Eqs. 14-16 with parameters from Table 14 of MEA at 30%wt: □, unloaded; ○, half loaded; Δ, full loaded.

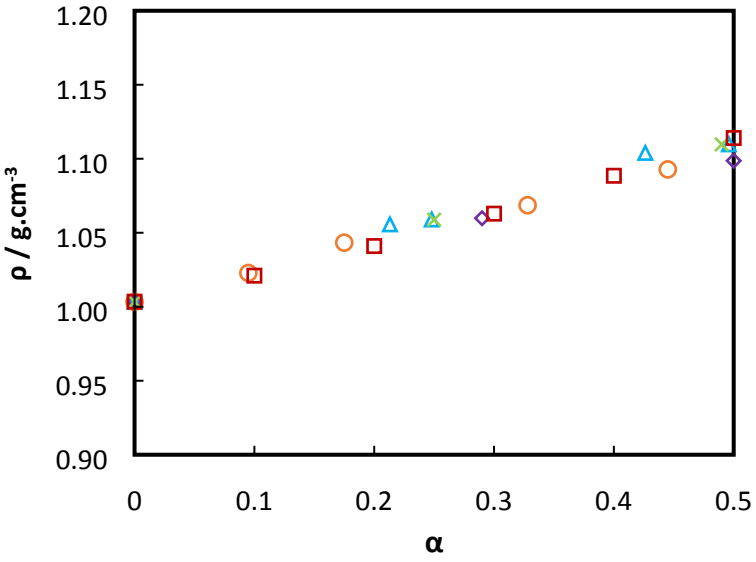

Figure S5. Density as a function of CO_2 loading at constant temperature of 313.15 K. *This work:* Δ; ×, [1]; ◊, [2]; ○ [3]; □, *[4].*

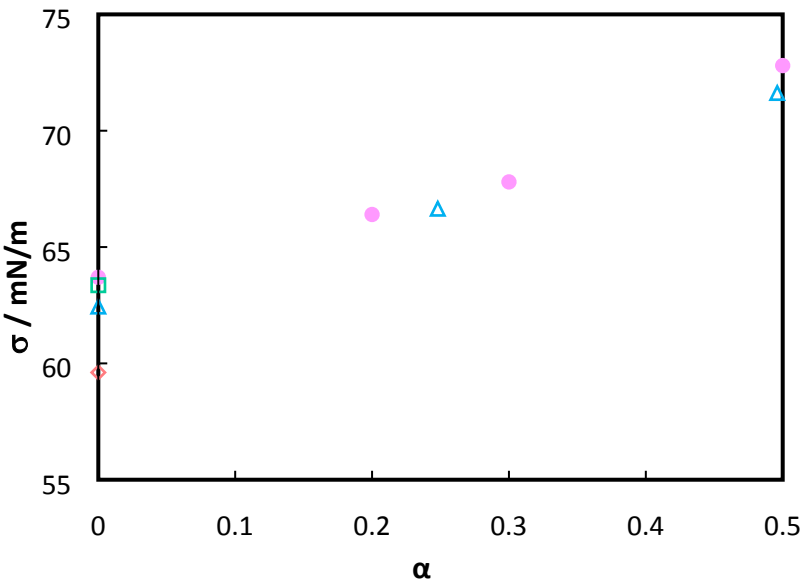

Figure S6. Surface tension as a function of CO_2 loading at constant temperature of 303.15 K. This work: Δ Comparison between our data: Δ, and literature data: ◊, [5]; ●, [6]; □, [7].

References

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