

Supporting Information

Table S.1 Speciation data for 30 wt% MEA in this work, compared to the values reported by Jakobsen et al.⁸

$\text{mol}_{\text{CO}_2}/\text{mol}_{\text{MEA}}$	pH	Alkalinity (mole $\text{CO}_2/\text{kg}_{\text{in}}$) - This work	$X_{\text{HCO}_3^-}$ (This work)	$X_{\text{free MEA}}$ (This work)	X_{MEACOO^-} (This work)	$X_{\text{MEA}^{\text{H}^+}}$ (This work)	$\text{mol}_{\text{CO}_2}/\text{mol}_{\text{MEA}}$	$X_{\text{HCO}_3^-}$ Jakobsen et al. (2005)	$X_{\text{free MEA}}$ Jakobsen et al. (2005)	X_{MEACOO^-} Jakobsen et al. (2005)	$X_{\text{MEA}^{\text{H}^+}}$ Jakobsen et al. (2005)
1.06E-01	1.08E+01	4.70E+00	2.37E-03	9.15E-02	9.67E-03	1.15E-02	1.10E-01	0.00E+00	1.02E-01	1.06E-02	8.10E-03
1.28E-01	1.08E+01	4.68E+00	2.16E-03	8.67E-02	1.24E-02	1.39E-02	2.10E-01	1.00E-04	7.32E-02	2.06E-02	1.78E-02
1.50E-01	1.07E+01	4.66E+00	2.03E-03	8.17E-02	1.51E-02	1.62E-02	2.50E-01	2.00E-04	5.91E-02	2.74E-02	2.45E-02
1.73E-01	1.07E+01	4.64E+00	1.98E-03	7.68E-02	1.77E-02	1.86E-02	2.90E-01	2.00E-04	5.56E-02	3.07E-02	2.36E-02
1.95E-01	1.06E+01	4.79E+00	2.01E-03	7.18E-02	2.03E-02	2.10E-02	4.00E-01	6.00E-04	3.31E-02	4.27E-02	4.47E-02
2.18E-01	1.06E+01	4.59E+00	2.12E-03	6.68E-02	2.28E-02	2.34E-02	6.00E-01	1.39E-02	9.00E-04	5.19E-02	6.32E-02
2.41E-01	1.05E+01	4.57E+00	2.32E-03	6.18E-02	2.52E-02	2.57E-02					
2.64E-01	1.04E+01	4.55E+00	2.61E-03	5.68E-02	2.76E-02	2.81E-02					
2.87E-01	1.03E+01	4.53E+00	2.98E-03	5.18E-02	2.99E-02	3.04E-02					
3.10E-01	1.02E+01	4.51E+00	3.44E-03	4.69E-02	3.21E-02	3.27E-02					
3.34E-01	1.01E+01	4.49E+00	3.98E-03	4.19E-02	3.42E-02	3.49E-02					
3.58E-01	9.94E+00	4.47E+00	4.62E-03	3.71E-02	3.62E-02	3.72E-02					
3.82E-01	9.79E+00	4.45E+00	5.34E-03	3.22E-02	3.81E-02	3.94E-02					
4.06E-01	9.63E+00	4.43E+00	6.14E-03	2.74E-02	4.00E-02	4.15E-02					
4.31E-01	9.46E+00	4.41E+00	7.04E-03	2.27E-02	4.17E-02	4.36E-02					
4.55E-01	9.28E+00	4.39E+00	8.01E-03	1.81E-02	4.33E-02	4.57E-02					
4.80E-01	9.09E+00	4.37E+00	9.07E-03	1.35E-02	4.48E-02	4.77E-02					
5.05E-01	8.89E+00	4.35E+00	1.02E-02	9.02E-03	4.62E-02	4.96E-02					
5.31E-01	8.67E+00	4.33E+00	1.14E-02	4.63E-03	4.75E-02	5.15E-02					

Table S.2 The square deviation (SD), mean square deviation (MSD), and root mean square deviation (RMSD) of the speciation measurements for 30 wt% MEA, in this work compare to literature data.⁸

mol _{CO2} /mol _{MEA}	X _{HCO3-} Jokobsen et al. (2005)	X _{free MEA} Jokobsen et al. (2005)	X _{MEACOO-} Jokobsen et al. (2005)	X _{MEA+} Jokobsen et al. (2005)	X _{HCO3-} (This work)	X _{free MEA} (This work)	X _{MEACOO-} (This work)	X _{MEA+} (This work)	SD (HCO ₃ ⁻)	SD (Xfree MEA)	SD (MEACOO ⁻)	SD (MEA ⁺)
1.10E-01	0.00E+00	1.02E-01	1.06E-02	8.10E-03	1.64E-03	9.10E-02	1.01E-02	1.18E-02	2.68E-06	1.22E-04	2.28E-07	1.35E-05
2.10E-01	1.00E-04	7.32E-02	2.06E-02	1.78E-02	2.56E-03	6.83E-02	2.21E-02	2.26E-02	6.05E-06	2.43E-05	2.15E-06	2.35E-05
2.50E-01	2.00E-04	5.91E-02	2.74E-02	2.45E-02	3.06E-03	5.96E-02	2.63E-02	2.68E-02	8.19E-06	2.14E-07	1.18E-06	5.06E-06
2.90E-01	2.00E-04	5.56E-02	3.07E-02	2.36E-02	3.66E-03	5.11E-02	3.03E-02	3.07E-02	1.20E-05	2.06E-05	1.96E-07	5.06E-05
4.00E-01	6.00E-04	3.31E-02	4.27E-02	4.47E-02	5.99E-03	2.88E-02	3.95E-02	4.09E-02	2.91E-05	1.88E-05	9.96E-06	1.44E-05
6.00E-01	1.39E-02	9.00E-04	5.19E-02	6.32E-02	1.47E-02	-7.76E-03	5.06E-02	5.67E-02	6.02E-07	7.50E-05	1.78E-06	4.19E-05
								MSD	9.77E-06	4.35E-05	2.58E-06	2.48E-05
								RMSD	3.13E-03	6.60E-03	1.61E-03	4.98E-03

$$SD = (X_{i,lit.} - X_{i,this\ work})^2 \quad (S.1)$$

$$MSD = [\Sigma(X_{i,lit.} - X_{i,this\ work})^2] / N \quad (S.2)$$

$$RMSD = \{[\Sigma(X_{i,lit.} - X_{i,this\ work})^2] / N\}^{0.5} \quad (S.3)$$

Where $X_{i,lit.}$, $X_{i,this\ work}$, and “N” are the mole fraction from literature, mole fraction measured in this work and number of data points, respectively.

Figure S.1 Typical total alkalinity (acid titration curve) for CO₂ loaded 30 wt% MEA solution.

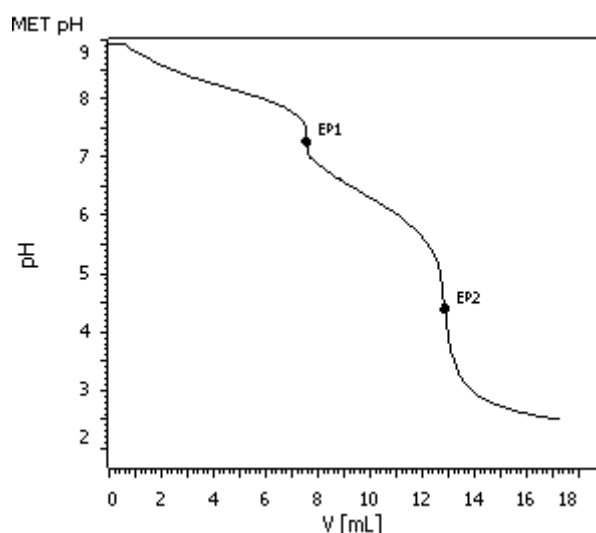


Figure S.2 Typical Dynamic Equivalence Titration (base titration) curve for CO₂ loaded 30 wt% MEA solution.

