

Supporting information

CO₂ Absorption into Aqueous Solutions containing 3-Piperidinemethanol (3-PM): CO₂ Mass Transfer, Stopped-Flow Kinetics, ¹H/¹³C NMR and Vapour-Liquid Equilibrium Investigations

William Conway^{1*}, Yaser Beyad², Marcel Maeder³, Robert Burns³, Paul Feron¹, and Graeme Puxty¹

- 1. CSIRO Energy Flagship, Mayfield West, NSW 2304, Australia*
- 2. CSIRO Energy Flagship, Clayton, VIC 3169, Australia*
- 3. Department of Chemistry, The University of Newcastle, Callaghan, NSW 2308, Australia*

* Corresponding author – Dr William Conway, CSIRO Energy Flagship, 10 Murray Dwyer Circuit, Mayfield West, NSW 2308, Australia will.conway@csiro.au ph + 61249 606098

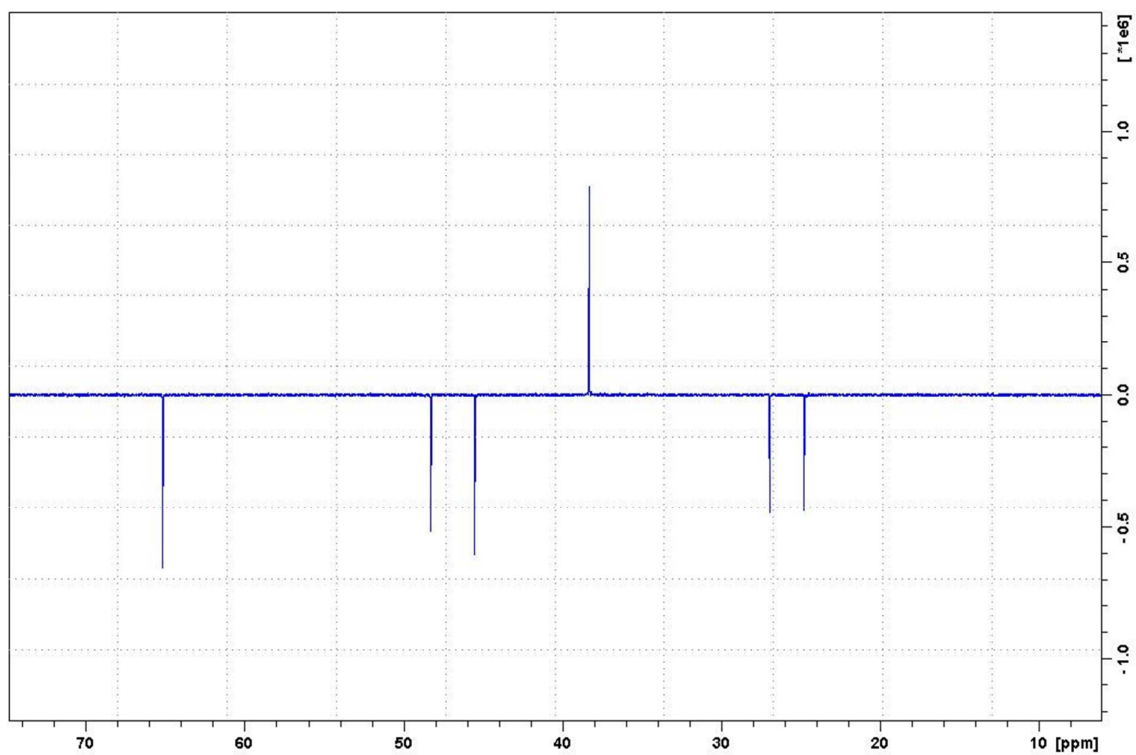


Figure S1. 1-Dimensional (1D) DEPT-135 ^{13}C spectra

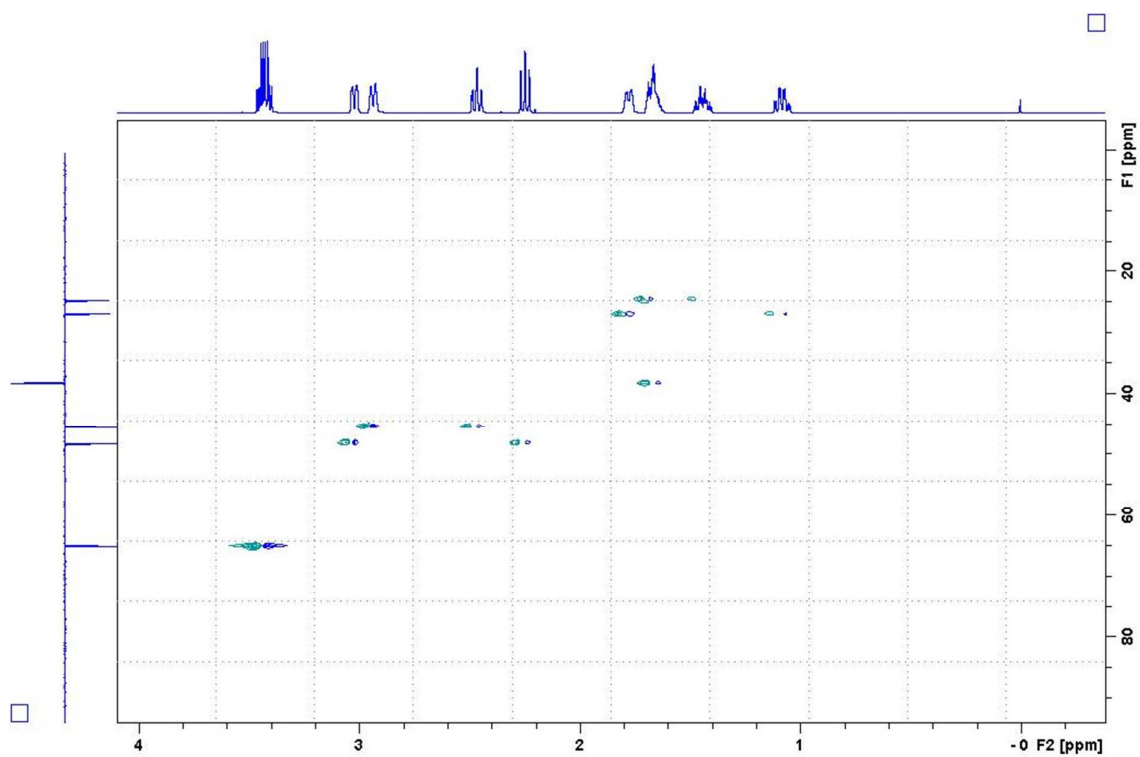


Figure S2. 2-Dimensional (2D) HSQC correlation spectra

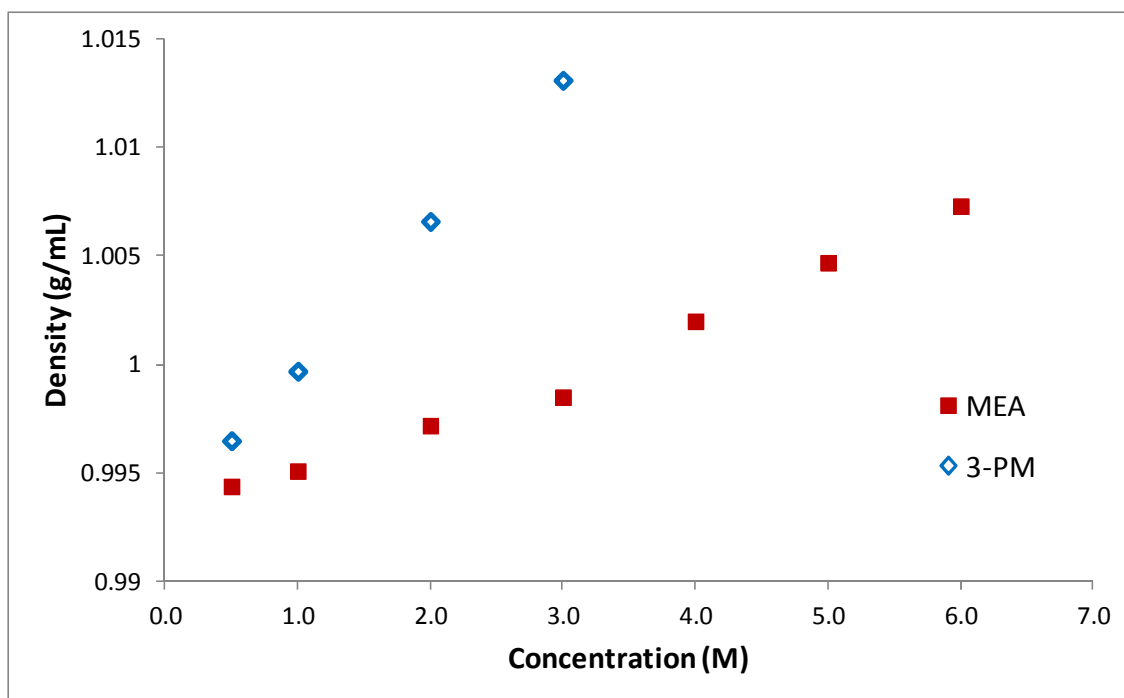


Figure S3. Density data at 40°C as a function of amine concentration in 3-PM and MEA solutions

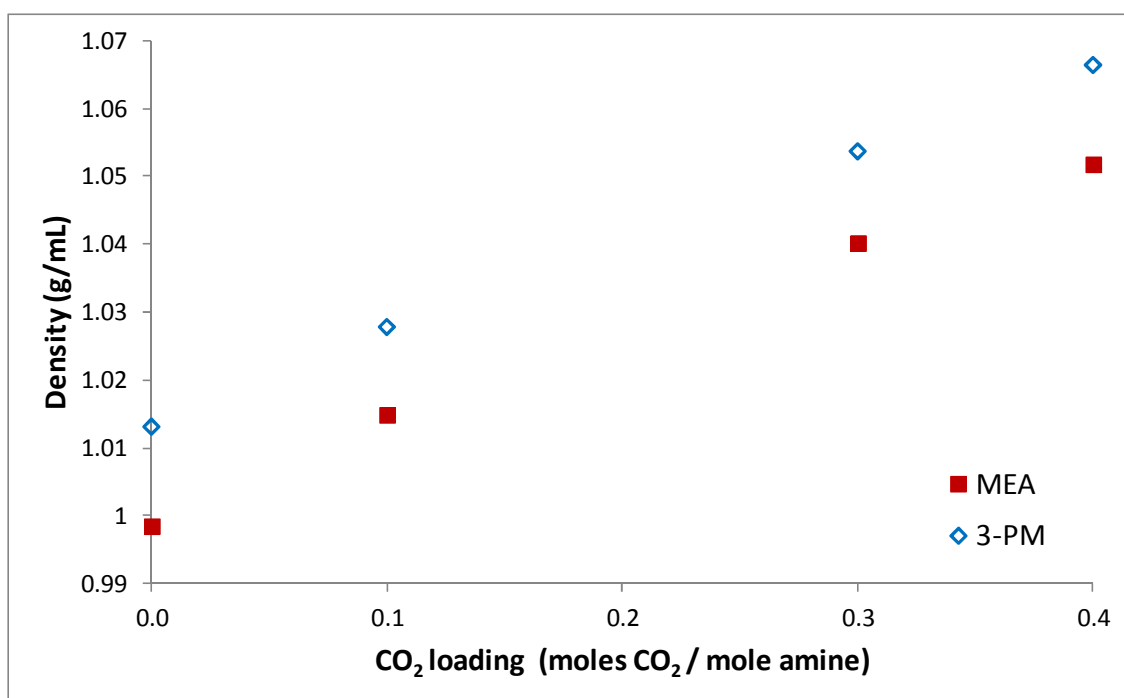


Figure S4. Density data at 40°C in 3.0M solutions of 3-PM and MEA over a range of CO₂ loadings from 0.0 – 0.4 moles CO₂ / mole amine.

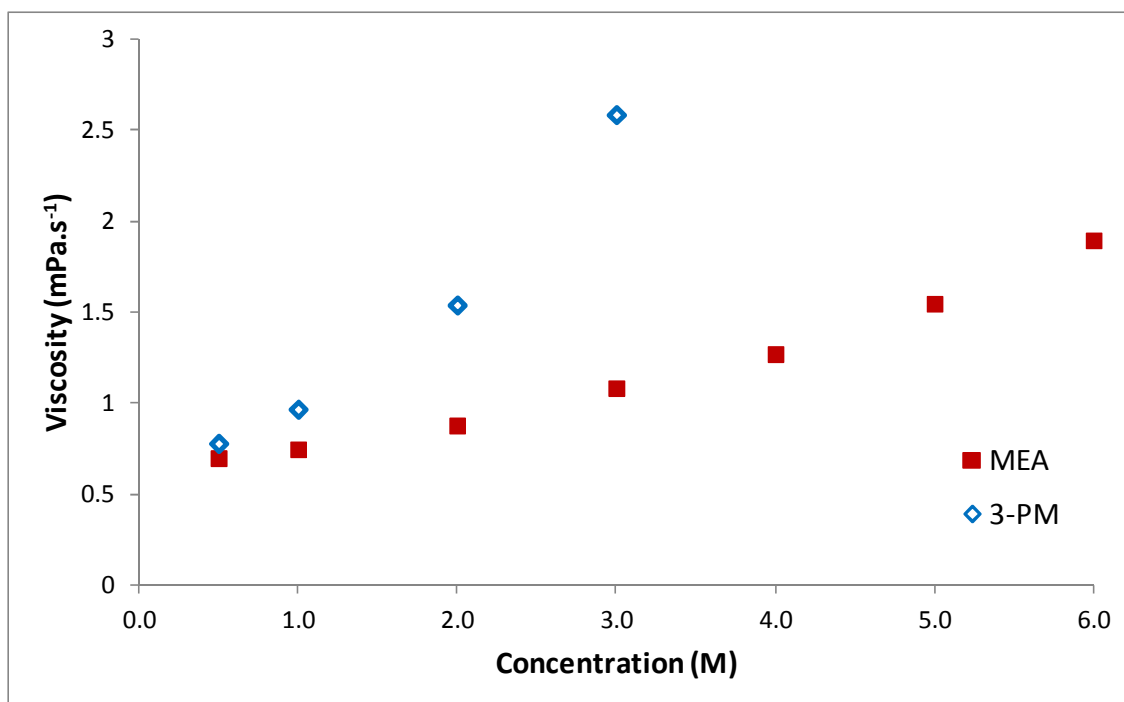


Figure S5. Viscosity data at 40°C as a function of amine concentration in 3-PM and MEA solutions

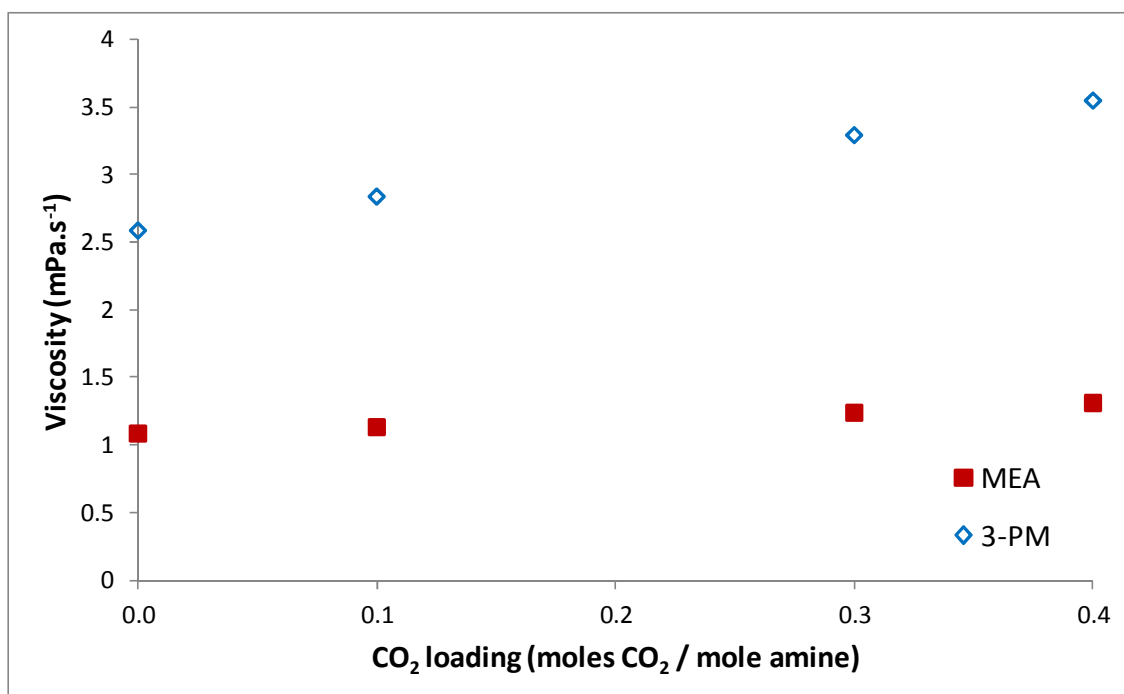


Figure S6. Viscosity data at 40°C in 3.0M solutions of 3-PM and MEA and over a range of CO₂ loadings from 0.0 – 0.4 moles CO₂ / mole amine.

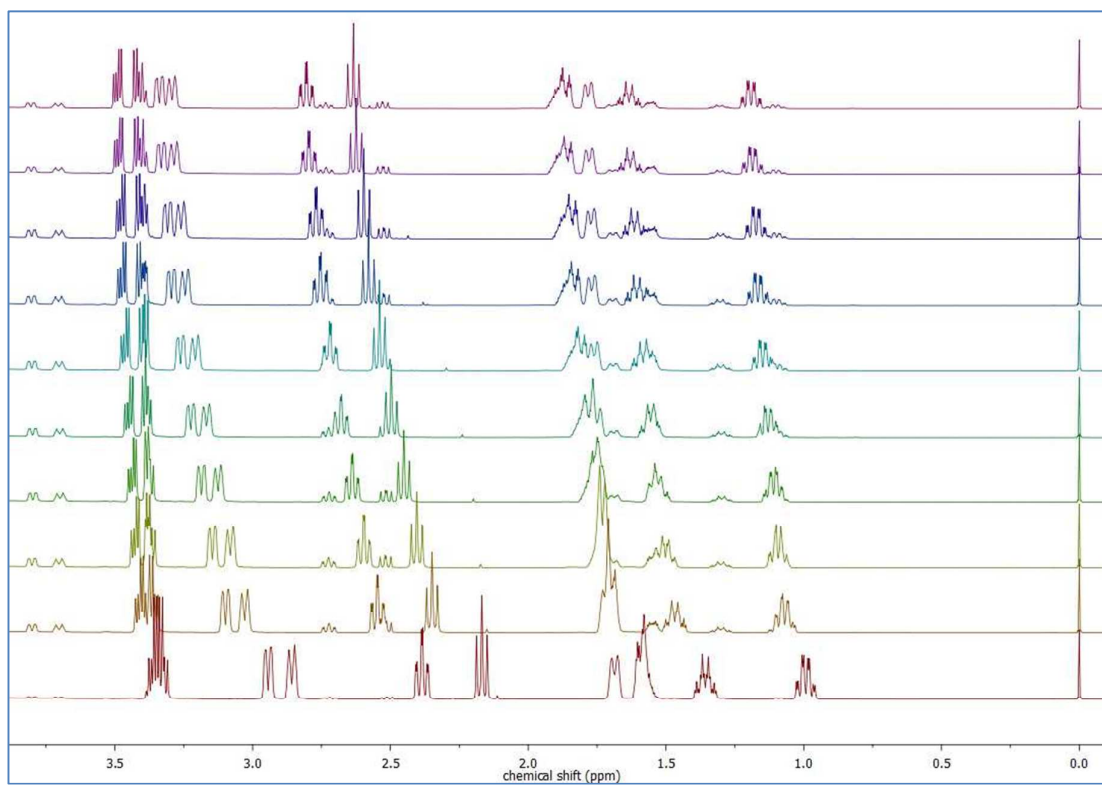


Figure S7. Stacked ^1H Spectra of equilibrium solutions at 25.0°C containing 0.5M 3-PM, 1.0M Na_2CO_3 , and varying amounts of additional HCl – Decreasing pH from top to bottom

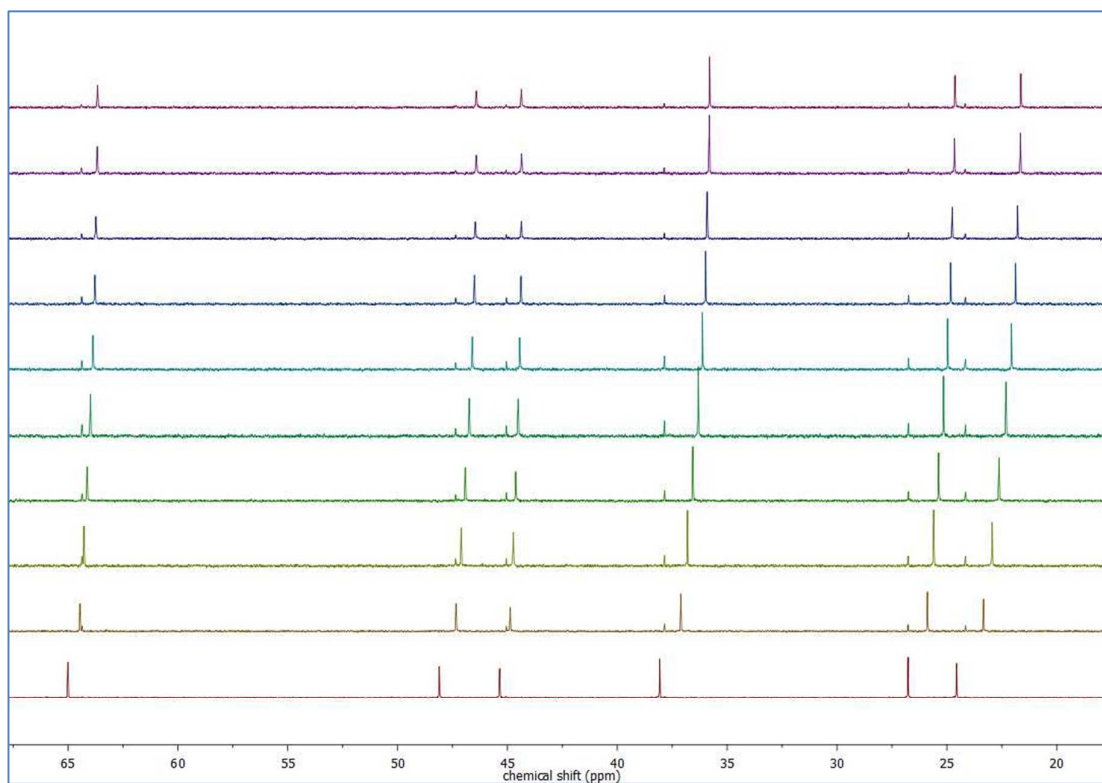


Figure S8. Stacked ^{13}C Spectra of equilibrium solutions at 25.0°C containing 0.5M 3-PM, 1.0M Na_2CO_3 , and varying amounts of additional HCl – Decreasing pH from top to bottom

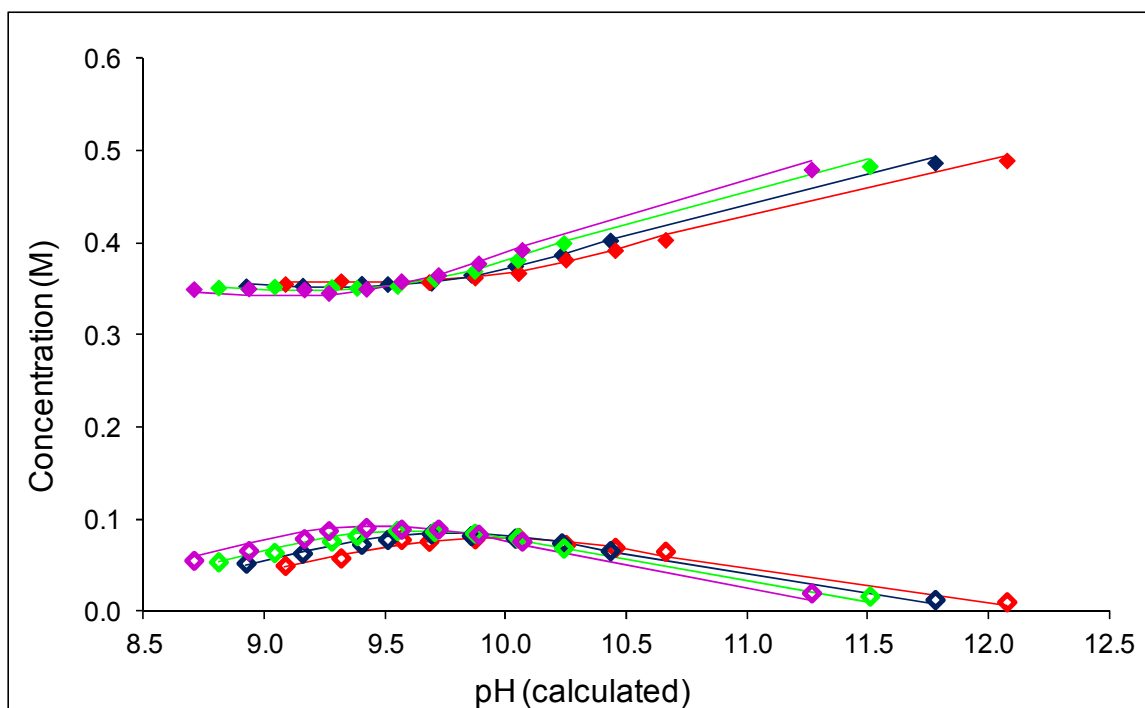


Figure S9. Concentration of 3-PM/3-PMH⁺ and 3-PM carbamate/3-PMcarbamic acid as a function of temperature and pH (calculated) in equilibrium solutions containing 0.5M 3-PM and 1.0M Na₂CO₃ via the analysis of ¹H NMR spectrum. Solid markers represent amine; hollow markers represent carbamate; left to right indicates decreasing temperature.