

## Supporting information

Manuscript: Gas-Liquid Equilibrium Data for Mixture Gas of Sulfur Dioxide + Nitrogen with Ethylene Glycol Aqueous Solutions at 298.15 K and 123.15 kPa

### *1 Desorption properties*

The desorption runs were carried with EGWs dissolving SO<sub>2</sub>, preheated to 333.15 K, and stirred by an agitator at atmospheric pressure for 20 min shown in **Table 1**.

Table 1 Desorption data of EGWs dissolving SO<sub>2</sub>

100 $\Phi_1$	100	90	80	70	60	50	40	20	0
Desorption efficiency/%	95	83	91	91	85	86	82	80	82

### *2 Surface tension and Viscosities of EGWs*

The drop-volume method was employed to measure surface tension,  $\gamma$ , for binary mixtures of EG with water over the whole composition range. All samples were equilibrated to  $T = (308.15, 313.15, 318.15, \text{ and } 323.15) \pm 0.02$  K under atmospheric pressure. The surface tension of solution is acquired by

$$\gamma = \frac{V \rho g}{r} F \quad (1)$$

where  $V$ ,  $\rho$ ,  $g$ ,  $r$ , and  $F$  denotes volume of solution, density of solution, acceleration of gravity, radius of titrating head ( $2r = 4.451$  mm), and emendation factor, respectively.

The viscosities were determined at  $T = (308.15, 313.15, 318.15, \text{ and } 323.15) \pm 0.02$  K with a capillary viscometer of Ubbelohde type which was checked by

measurement of the viscosity of pure water. The flow-time measurements were made using an accurate stopwatch with a precision of  $\pm 0.01$  s. The average of five or six sets of flow times for each fluid was taken for the purpose of the calculation of viscosity. The flow times were reproducible to  $\pm 0.06$  s.

Surface tensions of various aqueous solutions of EG were determined at 308.15 K, 313.15 K, 318.15 K, and 323.15 K, and the results are listed in **Table 2** and plotted as a function of EG concentration in **Figure 1**.

Table 2 Experimental surface tension,  $\gamma$ , of EG (1) + water (2) at different molar fractions of EG ( $x_1$ )

$x_1$	$\gamma / (\text{mN}\cdot\text{m}^{-1})$			
	T/K = 308.15	T/K = 313.15	T/K = 318.15	T/K = 323.15
0.0000	71.023	69.657	67.676	66.125
0.0145	69.732	66.552	65.925	63.244
0.0312	67.829	65.577	63.916	60.584
0.0484	66.131	64.095	62.244	59.621
0.0686	64.568	62.512	60.569	57.964
0.0883	63.274	61.325	59.211	56.767
0.1107	62.145	60.324	58.412	55.754
0.1621	60.017	58.103	56.253	54.153
0.2247	57.515	55.923	54.356	52.152
0.3032	56.034	54.446	52.663	50.524
0.4035	54.026	52.412	50.648	49.124
0.5366	52.470	50.701	49.336	47.875
1.0000	50.114	48.732	47.254	46.406

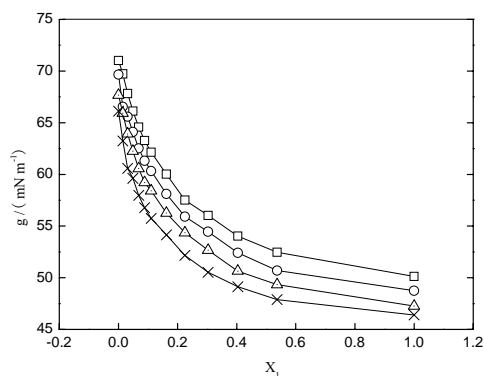


Figure 1 Surface tension of EG (1) + water (2) as a function of temperature at

different molar fractions of EG ( $x_1$ ): □ 308.15 K; ○ 313.15 K; △ 318.15 K; × 323.15 K.

Viscosities of EGWs were determined and the experimental results are shown in **Table 3** and plotted in **Figure 2**.

Table 3 Experimental viscosities,  $\eta$ , for EG (1) + water (2) at different mole fractions of EG ( $x_1$ )

$x_1$	$\eta/\text{mPa}\cdot\text{s}$			
	T/K = 308.15	T/K = 313.15	T/K = 318.15	T/K = 323.15
0.0000	0.7210	0.6532	0.5900	0.5500
0.0145	0.7542	0.7037	0.6336	0.5878
0.0312	0.8381	0.7640	0.6785	0.6321
0.0484	0.9241	0.8372	0.7424	0.6876
0.0686	1.0212	0.9256	0.7995	0.7433
0.0883	1.1333	1.0174	0.8755	0.8133
0.1107	1.2665	1.1266	0.9589	0.8853
0.1621	1.5744	1.4047	1.1838	1.0818
0.2247	2.0363	1.7717	1.4800	1.3388
0.3032	2.6616	2.2976	1.8883	1.6786
0.4035	3.5116	3.0166	2.4683	2.1786
0.5366	4.6996	4.0541	3.2830	2.8736
1.0000	9.2122	7.9605	6.2933	5.4468

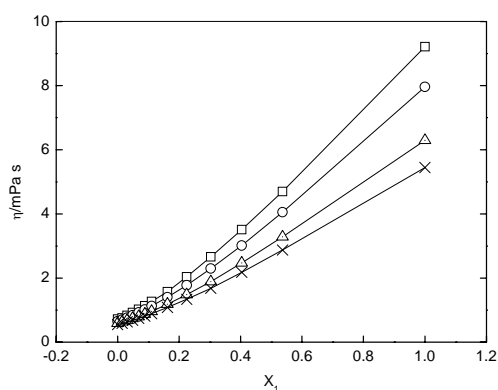


Figure 2 Experimental viscosities of EG (1) + water (2) as a function of temperature at different molar fractions of EG ( $x_1$ ): □, 308.15 K; ○, 313.15 K; △, 318.15 K; ×, 323.15 K.