

Supporting Information

Measurement and Modeling of Isobaric Vapor–Liquid Equilibrium of Water + Glycols

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Table S1. Experimental VLE data and activity coefficients γ_{H_2O} for H₂O + EG at temperature T , water molar composition x_{H_2O} and pressure p .

			p /MPa					
			0.07			0.05		
0.1			0.07			0.05		
x_{H_2O}	T /K	γ_{H_2O}	x_{H_2O}	T /K	γ_{H_2O}	x_{H_2O}	T /K	γ_{H_2O}
0.999	372.60	1.008	0.999	362.52	1.0242	0.999	353.64	1.0361
0.983	373.35	0.999	0.962	364.60	0.9829	0.966	355.15	1.0081
0.966	374.11	0.988	0.879	366.79	0.9929	0.928	356.65	0.9928
0.958	374.67	0.977	0.862	367.81	0.9731	0.903	357.51	0.9825
0.923	375.61	0.982	0.804	369.03	0.9978	0.890	357.31	1.0045
0.880	377.15	0.975	0.779	370.15	0.9903	0.851	358.54	1.0015
0.829	378.61	0.984	0.746	371.50	0.9826	0.761	361.70	0.9946
0.791	380.45	0.968	0.743	371.58	0.9820	0.715	363.65	0.9795
0.765	380.97	0.985	0.656	376.19	0.9462	0.656	366.27	0.9676
0.722	382.75	0.980	0.604	378.50	0.9488	0.626	366.87	0.9910
0.693	383.75	0.989	0.544	380.77	0.9758	0.616	367.49	0.9849
0.654	386.20	0.966	0.483	385.07	0.9496	0.608	367.90	0.9828
0.570	389.60	0.992	0.414	389.33	0.9642	0.538	371.65	0.9687
0.494	395.15	0.959	0.353	395.81	0.9202	0.486	374.68	0.9627
0.455	398.72	0.932	0.284	402.27	0.9380	0.427	378.67	0.9523
0.413	402.25	0.923				0.363	384.98	0.9043
0.317	410.95	0.932				0.291	392.25	0.8925

Standard uncertainties u are $u(x)=0.001$; $u(T)=1$ K and $u_r(p)=0.005$

Table S2. Experimental VLE data and activity coefficients γ_{H_2O} for H₂O + DEG at temperature T , water molar composition x_{H_2O} and pressure p .

p /MPa								
0.1			0.07			0.05		
x_{H_2O}	T /K	γ_{H_2O}	x_{H_2O}	T /K	γ_{H_2O}	x_{H_2O}	T /K	γ_{H_2O}
0.998	372.60	1.009	0.998	362.52	1.027	0.998	353.64	1.037
0.989	373.20	0.996	0.980	363.73	0.996	0.964	355.40	1.000
0.979	373.72	0.988	0.951	364.82	0.985	0.933	356.25	0.999
0.961	375.15	0.958	0.911	365.91	0.985	0.890	358.15	0.972
0.918	376.19	0.967	0.874	368.25	0.943	0.863	359.28	0.959
0.890	376.71	0.978	0.874	367.05	0.987	0.793	362.15	0.935
0.856	377.17	1.000	0.794	369.95	0.977	0.683	364.95	0.975
0.799	380.14	0.966	0.719	372.60	0.979	0.657	366.30	0.965
0.775	381.31	0.960	0.683	374.37	0.968	0.627	367.64	0.963
0.759	382.40	0.944	0.661	376.34	0.935	0.627	367.64	0.963
0.711	383.93	0.956	0.660	375.52	0.963	0.609	368.57	0.957
0.696	383.68	0.986	0.614	377.37	0.968	0.511	374.35	0.928
0.658	385.91	0.968	0.589	379.09	0.956	0.455	378.72	0.893
0.644	387.39	0.944	0.496	385.08	0.925	0.363	387.50	0.831
0.562	393.37	0.891	0.356	397.65	0.862	0.305	395.36	0.770
0.489	398.40	0.875	0.318	402.77	0.825	0.239	403.18	0.773
0.385	409.60	0.795	0.259	413.67	0.739	0.227	405.63	0.758
0.321	419.09	0.730	0.190	424.56	0.744			
0.246	429.60	0.720						

Standard uncertainties u are $u(x)=0.001$; $u(T)=1$ K and $u_r(p)=0.005$

Table S3. Experimental VLE data and activity coefficients γ_{H_2O} for H₂O + TriEG at temperature T , water molar composition x_{H_2O} and pressure p .

			p /MPa					
			0.1		0.07		0.05	
x_{H_2O}	T /K	γ_{H_2O}	x_{H_2O}	T /K	γ_{H_2O}	x_{H_2O}	T /K	γ_{H_2O}
0.984	373.62	0.987	0.987	364.38	0.967	0.974	355.04	1.005
0.969	373.90	0.992	0.974	363.83	0.999	0.960	355.65	0.997
0.965	374.47	0.976	0.958	364.67	0.985	0.939	356.13	0.995
0.940	375.25	0.975	0.937	365.45	0.978	0.927	356.56	0.994
0.924	375.7	0.976	0.918	366.07	0.975	0.915	356.91	0.993
0.921	375.88	0.973	0.897	366.65	0.977	0.870	358.86	0.968
0.871	377.91	0.959	0.865	367.95	0.965	0.801	360.77	0.972
0.849	378.31	0.970	0.823	369.20	0.969	0.780	361.79	0.961
0.826	379.18	0.968	0.804	369.85	0.968	0.752	363.25	0.943
0.777	381.73	0.943	0.753	371.85	0.961	0.716	364.79	0.936
0.746	383.25	0.935	0.710	374.65	0.922	0.706	365.69	0.918
0.692	386.87	0.893	0.656	377.39	0.907	0.644	368.60	0.901
0.621	390.44	0.886	0.601	381.32	0.865	0.543	374.33	0.871
0.600	392.66	0.853	0.533	385.24	0.855	0.492	378.79	0.822
0.550	396.85	0.816	0.455	393.15	0.776	0.435	387.20	0.702
0.491	401.01	0.806	0.339	410.80	0.611	0.430	388.70	0.676
0.405	411.58	0.715				0.367	395.52	0.637
0.354	420.64	0.636						

Standard uncertainties u are $u(x)=0.001$; $u(T)=1$ K and $u_r(p)=0.005$

Table S4. Experimental VLE data and activity coefficients γ_{H_2O} for H₂O + TeEG at temperature T , water molar composition x_{H_2O} and pressure p .

			p /MPa					
			0.1		0.07		0.05	
x_{H_2O}	T /K	γ_{H_2O}	x_{H_2O}	T /K	γ_{H_2O}	x_{H_2O}	T /K	γ_{H_2O}
0.989	373.50	0.987	0.988	363.60	0.994	0.989	354.90	0.995
0.956	374.60	0.981	0.963	364.38	0.990	0.948	356.65	0.966
0.935	375.45	0.963	0.941	365.04	0.988	0.919	357.65	0.960
0.908	376.27	0.964	0.906	366.2	0.982	0.878	358.64	0.967
0.875	377.57	0.966	0.884	367.03	0.977	0.849	360.05	0.947
0.845	378.79	0.959	0.858	368.22	0.963	0.811	361.35	0.943
0.821	379.70	0.957	0.832	369.22	0.958	0.751	364.26	0.913
0.796	381.37	0.931	0.792	371.23	0.935	0.663	368.95	0.867
0.764	382.90	0.922	0.765	373.48	0.894	0.631	372.37	0.805
0.710	385.86	0.899	0.751	373.21	0.918	0.601	374.86	0.771
0.648	389.26	0.882	0.683	377.46	0.870	0.562	376.71	0.775
0.615	392.23	0.843	0.657	379.56	0.842			
0.552	397.51	0.797	0.608	381.90	0.838			
			0.589	385.25	0.774			

Standard uncertainties u are $u(x)=0.001$; $u(T)=1$ K and $u_r(p)=0.005$

Table S5. Refractive indexes, η_D , as function of water mass fraction, w_{H_2O} , of the studied systems, at 303 K and 0.1 MPa.

H ₂ O +							
EG		DEG		TriEG		TeEG	
w_{H_2O}	η_D	w_{H_2O}	η_D	w_{H_2O}	η_D	w_{H_2O}	η_D
0.10	1.41960	0.11	1.43408	0.10	1.44204	0.10	1.44579
0.20	1.41005	0.20	1.42406	0.21	1.43047	0.21	1.43414
0.30	1.40080	0.30	1.41341	0.30	1.41992	0.30	1.42239
0.41	1.38994	0.41	1.40107	0.41	1.40643	0.40	1.40949
0.50	1.38106	0.50	1.38922	0.50	1.39413	0.50	1.39626
0.60	1.37126	0.60	1.37817	0.60	1.38175	0.60	1.38394
0.70	1.36074	0.70	1.36617	0.70	1.36838	0.70	1.36930
0.80	1.35122	0.80	1.35413	0.80	1.35616	0.79	1.35757
0.89	1.34168	0.90	1.34259	0.90	1.34378	0.89	1.34468
1.00	1.33179	1.00	1.33179	1.00	1.33179	1.00	1.33179

Standard uncertainties u are $u(w)=0.001$; $u(T)=0.05$ K, $u(\eta_D)=0.00002$ and $u_i(p)=0.005$