Electronic Supporting Information

Is ethaline a deep eutectic solvent?

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S1 Experimental section

Materials. Choline chloride (ChCl; $w > 0.98$; Sigma-Aldrich) was recrystallized from absolute ethanol (>0.998; Sigma-Aldrich) and dried for 5 days at 323 K with a high vacuum line ($p < 10^{-9}$ bar). Ethylene glycol (EG; $w > 0.998$; Sigma-Aldrich) was dried over 3 Å molecular sieve for 3 days. Its water mass fraction ($w_{H_2O} = m_{H_2O}/m_{sample}$) expressed in parts per million (ppm) was found to be 51 ± 13 ppm according to coulometric Karl Fischer titration (Metrohm 899 Coulometer).

{ChCl+EG} mixtures were prepared in a N_2-filled glovebox with a dew point of 211 K by mixing at $T \approx 308$ K appropriate masses of a stock solution with ChCl mole fraction $x_{ChCl} = 0.333$ ($w_{H_2O} = 280 \pm 20$ ppm) and neat EG. The obtained solutions were stored in tightly closed flasks in the glovebox until use.

Differential scanning calorimetry. The differential scanning calorimetry (DSC) curves were obtained using a PerkinElmer DSC 8500 instrument. Samples of ~30 mg, sealed in aluminum crucibles, were cooled down to $T = 203$ K with a cooling rate of $1\,K \cdot min^{-1}$, followed by an isothermal step at $T = 203$ K lasting for 12 or 24 hours, depending on a sample composition. Finally, the samples were heated to 328 K with a heating rate of 2 or $5\,K \cdot min^{-1}$. During all steps the measurement system was purged with dry nitrogen.

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S2 Supporting figures and tables

Figure S1: Ethylene glycol + choline chloride mixture with the nominal ChCl mole fraction of $x_{\mathrm{ChCl}} = 0.3333$ ("ethaline"). After complete ChCl dissolution at ~308 K the sample, containing (2831 ± 54) ppm of water, was kept at 293 K over night.

Table S1: Liquidus temperatures, T_i, and associated solidus temperatures, T_{eut}, at mixture compositions, x_{ChCl}, of {ChCl+EG}.

x_{ChCl}	T_{eut} (K)	T_i (K)
0.000		260.3
0.044	243.0	260.7
0.093	244.2	255.8
0.115	246.7	254.6
0.137	243.6	251.5
0.161	244.8	251.6
0.185	245.8	257.2
0.217	244.3	265.3
0.248	243.2	275.6
0.291	243.5	288.7
0.333	245.0	304.9

Table S2: Melting point, T_i^*, and enthalpy of fusion, ΔH_i^*, of choline chloride (ChCl) and ethylene glycol (EG) reported in literature

Substance	T_i^* (K)	ΔH_i^* (kJ·mol^{-1})	Ref.
EG	260.6	9.958	1
EG	260.8	11.623	2
ChCl[a]	597 ± 7	4.3 ± 0.6	3
ChCl	≈597		4
ChCl	577.99		5
ChCl[b]	352.92	17.19	6
ChCl[b]	351		7
ChCl[b]	351.62	7.34	8

[a] Decomposition; [b] Solid-solid ($\alpha \rightarrow \beta$ polymorph) transition.

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