

Supporting information

Conductivities of CuSO₄ and CdSO₄ in Sucrose/Trehalose–Water Systems at 298.15 K

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Table S1. Values of densities (ρ), viscosities (η) and relative dielectric constants (D) in water + saccharide (sucrose, trehalose) mixtures at 298.15 K

m_s (mol·kg ⁻¹)	ρ_0 (g·cm ⁻³)	η_0 (mPa·s)	D	m_s (mol·kg ⁻¹)	ρ_0 (g·cm ⁻³)	η_0 (mPa·s)	D
0	0.997046 ^a	0.8904 ^b	78.54 ^c				
	Water + Sucrose				Water + Trehalose		
0.0500	1.003534	0.930	78.0	0.0500	1.003808	0.935	78.1
0.1000	1.009882	0.974	77.8	0.1000	1.010419	0.982	77.7
0.1500	1.016103	1.017	77.3	0.1500	1.016900	1.032	77.3
0.2000	1.022166	1.064	76.8	0.2000	1.023219	1.084	76.8
0.2500	1.028122	1.114	76.5	0.2500	1.029393	1.139	76.6
0.3000	1.033926	1.166	76.0	0.3000	1.035477	1.197	76.2

^aTaken from Ref. [11-12] ^bTaken from Ref. [13] ^cTaken from Ref. [16]

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Table S2. Solution densities (ρ) and molar conductivity of $\frac{1}{2}\text{CuSO}_4$ (Λ) in water and water + saccharide (sucrose, trehalose) mixtures at 298.15 K

$10^4 c_{\text{CuSO}_4}$ (mol·dm ⁻³)	ρ (g·cm ⁻³)	Λ (S·cm ² ·mol ⁻¹)	$10^4 c_{\text{CuSO}_4}$ (mol·dm ⁻³)	ρ (g·cm ⁻³)	Λ (S·cm ² ·mol ⁻¹)
Pure water					
1.5056	0.9970	124.99	6.3560	0.9971	112.87
2.7609	0.9970	120.79	6.8910	0.9971	111.86
3.8811	0.9971	117.97	7.4489	0.9971	110.93
4.8780	0.9971	115.78	7.9970	0.9971	109.98
5.6966	0.9971	114.15	8.3767	0.9971	109.35
Water + Sucrose					
$m_S = 0.0500 \text{ mol·kg}^{-1}$			$m_S = 0.1000 \text{ mol·kg}^{-1}$		
0.8681	1.0035	122.69	1.0424	1.0099	117.38
1.7443	1.0035	119.41	2.0362	1.0099	113.79
2.6049	1.0035	116.66	2.9664	1.0099	111.16
3.4218	1.0035	114.38	3.8267	1.0099	109.05
4.2220	1.0036	112.48	4.6314	1.0099	107.43
4.9788	1.0036	110.87	5.4090	1.0099	105.82
5.7567	1.0036	109.33	6.1817	1.0099	104.43
6.5156	1.0036	107.91	6.9026	1.0100	103.17
7.2224	1.0036	106.73	7.6495	1.0100	102.02
8.2663	1.0036	105.06	8.5168	1.0100	100.73
$m_S = 0.1500 \text{ mol·kg}^{-1}$			$m_S = 0.2000 \text{ mol·kg}^{-1}$		
0.8383	1.0161	113.71	0.8417	1.0222	109.37
1.7112	1.0161	110.52	1.6843	1.0222	106.46
2.6032	1.0161	107.91	2.5595	1.0222	103.89
3.5005	1.0161	105.62	3.4197	1.0222	101.78
4.3361	1.0161	103.86	4.2745	1.0222	100.05
5.1207	1.0162	102.25	5.0221	1.0222	98.60
5.9045	1.0162	100.88	5.8002	1.0222	97.21
6.7841	1.0162	99.43	6.5705	1.0222	95.93
7.8362	1.0162	97.82	7.2923	1.0223	94.85
8.7696	1.0162	96.52	8.2396	1.0223	93.56
$m_S = 0.2500 \text{ mol·kg}^{-1}$			$m_S = 0.3000 \text{ mol·kg}^{-1}$		
1.6468	1.0281	102.35	1.9397	1.0339	97.50
2.5423	1.0281	99.79	2.8229	1.0340	95.19
3.4371	1.0281	97.71	3.8748	1.0340	92.98
4.2800	1.0282	95.95	4.8500	1.0340	91.19
5.1231	1.0282	94.35	5.6983	1.0340	89.81
5.9625	1.0282	92.98	6.5839	1.0340	88.45
6.7762	1.0282	91.68	7.3338	1.0340	87.37
7.6106	1.0282	90.51	8.3983	1.0340	85.99
8.5387	1.0282	89.27	9.5822	1.0341	84.59
9.3251	1.0282	88.25	10.7761	1.0341	83.31

Table S2. (continued)

$10^4 c_{\text{CuSO}_4}$ (mol·dm ⁻³)	ρ (g·cm ⁻³)	A (S·cm ² ·mol ⁻¹)	$10^4 c_{\text{CuSO}_4}$ (mol·dm ⁻³)	ρ (g·cm ⁻³)	A (S·cm ² ·mol ⁻¹)
Water+ Trehalose					
$m_S = 0.0500 \text{ mol·kg}^{-1}$			$m_S = 0.1000 \text{ mol·kg}^{-1}$		
1.7113	1.003814	118.71	1.6813	1.010386	113.59
2.5314	1.003828	116.53	2.4856	1.010399	111.31
3.3345	1.003841	114.26	3.2381	1.010412	109.23
4.0833	1.003854	112.36	4.0170	1.010425	107.40
4.8231	1.003866	110.72	4.7641	1.010437	105.83
5.6004	1.003879	109.15	5.5179	1.010450	104.33
6.3607	1.003891	107.69	6.3014	1.010462	102.89
7.0847	1.003903	106.38	7.3687	1.010480	101.11
7.7740	1.003915	105.25	8.0393	1.010491	100.10
8.4087	1.003925	104.19	8.8636	1.010505	98.90
$m_S = 0.1500 \text{ mol·kg}^{-1}$			$m_S = 0.2000 \text{ mol·kg}^{-1}$		
0.8595	1.016852	110.36	1.7055	1.023186	103.49
1.7064	1.016867	107.81	2.5370	1.023200	101.48
2.5463	1.016881	105.34	3.3879	1.023214	99.41
3.3885	1.016895	102.86	4.1777	1.023227	97.74
4.2439	1.016910	100.77	4.9503	1.023240	96.21
5.0276	1.016923	99.25	5.7126	1.023253	94.80
5.8741	1.016937	97.76	6.5915	1.023267	93.39
6.6706	1.016950	96.55	7.4393	1.023282	92.08
7.4531	1.016964	95.36	8.3063	1.023296	90.90
8.2965	1.016978	94.24	9.4317	1.023315	89.49
$m_S = 0.25000 \text{ mol·kg}^{-1}$			$m_S = 0.3000 \text{ mol·kg}^{-1}$		
1.6931	1.029450	99.00	1.7956	1.035501	94.39
2.5587	1.029464	96.59	2.6911	1.035515	92.36
3.3917	1.029477	94.72	3.6722	1.035531	90.30
4.1461	1.029489	93.26	4.5787	1.035546	88.56
4.9525	1.029503	91.78	5.4372	1.035560	87.16
5.7966	1.029516	90.49	6.3859	1.035575	85.70
6.7400	1.029532	89.01	7.4261	1.035592	84.30
7.8806	1.029550	87.47	8.4361	1.035608	83.00
8.7491	1.029564	86.36	9.6680	1.035628	81.61
9.8722	1.029583	85.01	10.7189	1.035645	80.48

Table S3. Solution densities (ρ) and molar conductivity of $\frac{1}{2}\text{CdSO}_4$ (Λ) in water and water + saccharide (sucrose, trehalose) mixtures at 298.15 K

$10^4 c_{\text{CdSO}_4}$ (mol·dm ⁻³)	ρ (g·cm ⁻³)	Λ (S·cm ² ·mol ⁻¹)	$10^4 c_{\text{CdSO}_4}$ (mol·dm ⁻³)	ρ (g·cm ⁻³)	Λ (S·cm ² ·mol ⁻¹)
Pure water					
1.0828	0.9970	127.64	5.7167	0.9971	114.91
2.1268	0.9970	123.70	6.2100	0.9971	113.91
3.1611	0.9971	120.68	6.8561	0.9971	112.85
4.0969	0.9971	118.33	7.7140	0.9972	111.40
4.8954	0.9971	116.54	8.2821	0.9972	110.60
Water + Sucrose					
$m_S = 0.0500 \text{ mol·kg}^{-1}$			$m_S = 0.1000 \text{ mol·kg}^{-1}$		
0.9811	1.0035	123.29	0.8953	1.0099	119.47
1.6829	1.0035	120.71	1.8278	1.0099	115.75
2.5739	1.0035	117.70	2.7067	1.0099	112.97
3.4966	1.0036	115.16	3.6026	1.0099	110.60
4.3768	1.0036	113.14	4.4747	1.0099	108.55
5.2468	1.0036	111.26	5.3846	1.0099	106.74
6.0367	1.0036	109.77	6.1924	1.0100	105.32
6.8377	1.0036	108.41	6.9343	1.0100	104.01
7.6209	1.0036	107.11	7.7527	1.0100	102.76
8.4013	1.0037	105.94	8.6569	1.0100	101.43
$m_S = 0.1500 \text{ mol·kg}^{-1}$			$m_S = 0.2000 \text{ mol·kg}^{-1}$		
1.5474	1.0161	111.34	1.0773	1.0221	109.25
2.3233	1.0161	109.00	2.0826	1.0222	105.86
3.0595	1.0161	107.00	3.0743	1.0222	103.13
3.7964	1.0161	105.32	4.0495	1.0222	100.95
4.5119	1.0162	103.78	5.0398	1.0222	99.01
5.2232	1.0162	102.42	5.8169	1.0222	97.59
5.9487	1.0162	101.09	6.7454	1.0223	96.12
7.0003	1.0162	99.35	7.6424	1.0223	94.81
8.0184	1.0162	97.86	8.5075	1.0223	93.64
9.1906	1.0163	96.27	9.8303	1.0223	92.01
$m_S = 0.2500 \text{ mol·kg}^{-1}$			$m_S = 0.3000 \text{ mol·kg}^{-1}$		
1.0037	1.0282	105.18	2.1303	1.0339	97.55
1.9693	1.0282	101.97	3.1216	1.0339	95.10
2.9396	1.0282	99.55	4.0833	1.0340	93.08
3.9384	1.0282	97.22	5.0768	1.0340	91.21
4.8743	1.0283	95.48	5.9939	1.0340	89.80
5.7408	1.0283	94.01	6.9468	1.0340	88.34
6.5933	1.0283	92.64	7.8137	1.0340	87.18
7.4175	1.0283	91.45	8.6724	1.0341	86.13
8.5838	1.0283	89.86	9.8701	1.0341	84.74
9.6515	1.0284	88.59	10.8921	1.0341	83.65

Table S3. (continued)

$10^4 c_{\text{CdSO}_4}$ (mol·dm ⁻³)	ρ (g·cm ⁻³)	A (S·cm ² ·mol ⁻¹)	$10^4 c_{\text{CdSO}_4}$ (mol·dm ⁻³)	ρ (g·cm ⁻³)	A (S·cm ² ·mol ⁻¹)
Water+ Trehalose					
$m_S = 0.0500 \text{ mol·kg}^{-1}$			$m_S = 0.1000 \text{ mol·kg}^{-1}$		
1.7781	1.003800	118.98	2.6549	1.010407	111.28
2.5387	1.003816	116.75	3.3939	1.010422	109.21
3.1939	1.003830	114.87	4.0939	1.010437	107.57
3.8875	1.003844	113.04	4.7742	1.010451	106.20
4.5835	1.003859	111.55	5.5271	1.010467	104.85
5.2339	1.003872	110.18	6.3391	1.010484	103.40
5.9119	1.003886	108.79	7.0307	1.010498	102.24
6.5709	1.003900	107.58	7.7760	1.010514	101.16
7.1880	1.003913	106.58	8.4211	1.010527	100.17
8.3102	1.003936	104.79	9.1478	1.010543	99.18
$m_S = 0.1500 \text{ mol·kg}^{-1}$			$m_S = 0.2000 \text{ mol·kg}^{-1}$		
1.8818	1.016851	108.70	0.9467	1.023167	107.58
2.7918	1.016870	106.33	1.8337	1.023186	104.41
3.6026	1.016886	104.32	2.7305	1.023204	101.85
4.3302	1.016901	102.69	3.6377	1.023223	99.69
5.0692	1.016916	101.23	4.4780	1.023240	97.92
5.8780	1.016933	99.72	5.3064	1.023257	96.35
6.6304	1.016948	98.43	6.1330	1.023274	94.87
7.3510	1.016963	97.33	6.8982	1.023290	93.58
8.3221	1.016983	95.90	7.6666	1.023305	92.39
9.1979	1.017000	94.73	8.4061	1.023320	91.36
$m_S = 0.25000 \text{ mol·kg}^{-1}$			$m_S = 0.3000 \text{ mol·kg}^{-1}$		
1.6306	1.029289	100.50	1.6057	1.035498	95.96
2.4777	1.029307	98.04	2.4037	1.035515	93.85
3.2981	1.029324	96.13	3.1914	1.035531	91.99
4.1185	1.029341	94.34	3.9502	1.035546	90.49
4.8614	1.029356	92.92	4.7431	1.035563	88.87
5.6756	1.029373	91.50	5.5966	1.035580	87.47
6.5471	1.029392	90.10	6.5087	1.035599	86.12
7.4039	1.029410	88.92	7.5789	1.035621	84.61
8.5078	1.029433	87.46	8.7539	1.035645	83.15
9.7891	1.029459	85.93	10.2576	1.035676	81.44