SUPPLEMENTARY INFORMATION

Table 1. Critical micelle concentration and thermodynamic parameters of SDS (a) and in various concentrations of mannitol solution (b) 0.1 M (c) 0.2 M (d) 0.3 M (e) 0.6 M (f) 0.8 M

(a) Thermodynamics of Sodium dodecyl sulphate (SDS) solution.

Temp (K)	cmc $\times 10^{-3}$ M	X_{cmc} (cmc $\times 10^{-5}$ mole fraction)	ln X_{cmc}	ΔG^o_m kJ mol^{-1}	ΔH^o_m kJ mol^{-1}	ΔS^o_m J K^{-1} mol^{-1}	ΔC^o_p J K^{-1} mol^{-1}
285	7.80	14.04	-8.87	-21.02	-2.16	66.17	
293	8.00	14.40	-8.85	-21.55	-4.71	57.47	
298	8.12	14.61	-8.83	-21.88	-4.87	57.07	
303	8.50	15.30	-8.79	-22.13	-5.04	56.41	-33.53
308	8.87	15.96	-8.74	-22.39	-5.21	55.79	
313	9.12	16.41	-8.71	-22.68	-5.38	55.28	
318	9.32	16.77	-8.69	-22.98	-5.55	54.83	
323	9.80	17.64	-8.64	-23.21	5.46	88.78	
328	9.60	17.28	-8.66	-23.63	5.64	89.21	34.36
333	9.20	16.56	-8.71	-24.10	5.81	89.82	

(b) Sodium dodecyl sulphate (SDS) in 0.1M mannitol solution.

Temp (K)	cmc $\times 10^{-3}$ M	X_{cmc} (cmc $\times 10^{-5}$ mole fraction)	ln X_{cmc}	ΔG^o_m kJ mol^{-1}	ΔH^o_m kJ mol^{-1}	ΔS^o_m J K^{-1} mol^{-1}	ΔC^o_p J K^{-1} mol^{-1}
285	4.70	8.44	-9.38	-22.22	-11.83	36.47	
293	4.90	8.80	-9.34	-22.75	-12.50	34.96	-84.85
298	6.00	10.80	-9.14	-22.63	-12.93	32.54	
303	4.40	7.90	-9.45	-23.79	-7.08	55.16	
313	4.80	8.62	-9.36	-24.35	-7.56	53.66	
318	5.30	9.52	-9.26	-24.48	-7.80	52.45	-49.88
323	5.30	9.52	-9.26	-24.86	-8.05	52.07	
333	5.80	10.40	-9.17	-25.38	-8.55	50.55	

(c) SDS in 0.2M mannitol

Temp (K)	cmc $\times 10^{-3}$ M	X_{cmc} (cmc $\times 10^{-5}$ mole fraction)	ln X_{cmc}	ΔG^o_m kJ mol^{-1}	ΔH^o_m kJ mol^{-1}	ΔS^o_m J K^{-1} mol^{-1}	ΔC^o_p J K^{-1} mol^{-1}
285	5.10	9.16	-9.30	-22.03	-12.57	33.19	
293	5.90	10.60	-9.15	-22.29	-13.29	30.74	-90.16
298	6.50	11.68	-9.06	-22.44	-13.74	29.17	
303	4.60	8.26	-9.40	-23.68	-7.40	53.74	
313	5.20	9.34	-9.28	-24.15	-7.90	51.91	
318	5.50	9.88	-9.22	-24.38	-8.15	51.04	-52.13
323	5.60	10.06	-9.20	-24.72	-8.41	50.49	
333	6.20	11.14	-9.10	-25.20	-8.94	48.84	

(d) SDS in 0.3M mannitol

Temp (K)	cmc $\times 10^{-3}$ M	X_{cmc} (cmc $\times 10^{-5}$ mole fraction)	ln X_{cmc}	ΔG^o_m kJ mol^{-1}	ΔH^o_m kJ mol^{-1}	ΔS^o_m J K^{-1} mol^{-1}	ΔC^o_p J K^{-1} mol^{-1}
285	4.30	7.72	-9.47	-22.44	-13.78	30.36	
293	5.10	9.16	-9.30	-22.65	-14.57	27.58	-98.86
298	5.60	10.06	-9.20	-22.80	-15.07	25.95	
303	5.10	9.16	-9.30	-23.42	-6.80	54.85	
313	5.60	10.06	-9.20	-23.95	-7.26	53.33	
318	5.80	10.42	-9.17	-24.24	-7.49	52.67	-47.92
323	6.30	11.32	-9.09	-24.40	-7.73	51.61	
333	6.60	11.86	-9.04	-25.03	-8.22	50.49	

(e) SDS in 0.6M mannitol

Temp (K)	cmc $\times 10^{-3}$ M	X_{cmc} (cmc $\times 10^{-5}$ mole fraction)	ln X_{cmc}	ΔG^o_m kJ mol^{-1}	ΔH^o_m kJ mol^{-1}	ΔS^o_m J K^{-1} mol^{-1}	ΔC^o_p J K^{-1} mol^{-1}
285	4.00	7.19	-9.54	-22.61	-12.19	36.54	
293	4.40	7.90	-9.45	-23.01	-12.89	34.54	-87.45
298	5.10	9.16	-9.30	-23.04	-13.33	32.57	
303	5.30	9.52	-9.26	-23.33	-6.12	56.79	
313	5.80	10.42	-9.17	-23.86	-6.53	55.37	
318	5.90	10.60	-9.15	-24.20	-6.74	54.90	-43.10
323	6.40	11.50	-9.07	-24.36	-6.95	53.89	
333	6.70	12.04	-9.03	-24.99	-7.39	52.84	

(f) SDS in 0.8M mannitol

Temp (K)	cmc $\times 10^{-3}$ M	X_{cmc} (cmc $\times 10^{-5}$ mole fraction)	ln X_{cmc}	ΔG^o_m kJ mol^{-1}	ΔH^o_m kJ mol^{-1}	ΔS^o_m J K^{-1} mol^{-1}	ΔC^o_p J K^{-1} mol^{-1}
285	3.20	5.75	-9.76	-23.14	-10.99	42.62	
293	3.40	6.11	-9.70	-23.64	-11.61	41.03	-78.81
298	4.00	7.19	-9.54	-23.64	-12.01	39.01	
303	5.60	10.06	-9.20	-23.19	-5.48	58.42	
313	6.20	11.14	-9.10	-23.69	-5.85	56.98	
318	6.50	11.68	-9.06	-23.94	-6.04	56.29	-38.64
323	6.80	12.22	-9.01	-24.20	-6.23	55.61	
333	6.90	12.40	-9.00	-24.90	-6.62	54.90	

Table 2. Degree of counterion binding (β) for SDS in different concentrations of mannitol at different temperatures

β		Concentration of Mannitol				
Temp. K	SDS	0.1 M	0.2 M	0.3 M	0.6 M	0.8 M
285	0.675	0.609	0.614	0.620	0.637	0.649
293	0.641	0.593	0.594	0.595	0.600	0.602
303	0.613	0.579	0.577	0.575	0.568	0.564
313	0.593	0.570	0.565	0.561	0.547	0.537
323	0.579	0.563	0.557	0.550	0.531	0.518
333	0.551	0.558	0.550	0.542	0.519	0.503

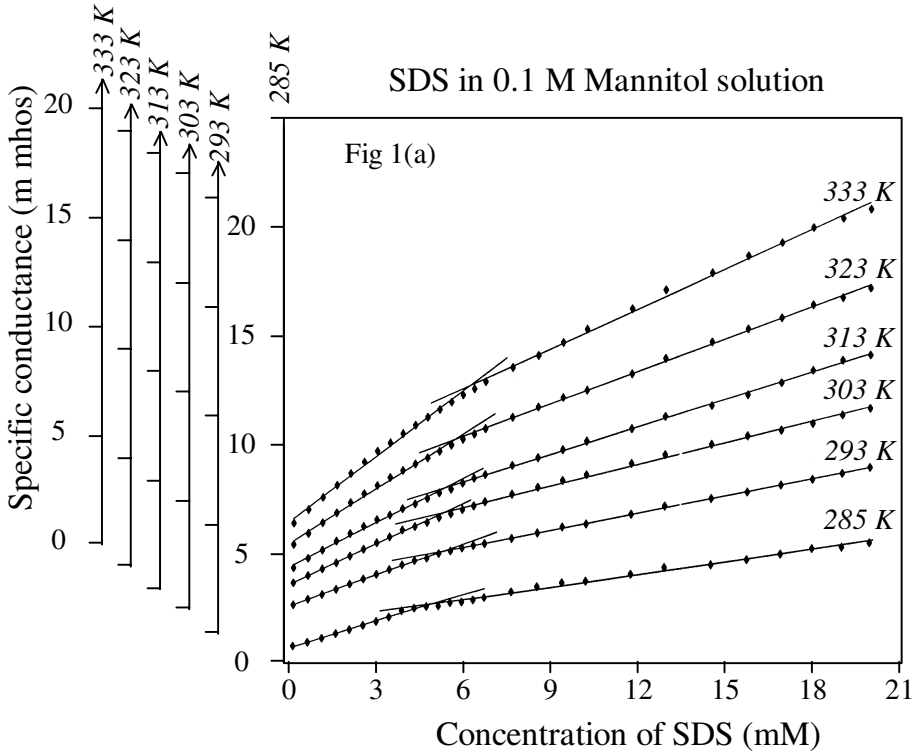
Table 3. Hydrophobic free energy of transfer, ΔG^o_{HP} (kJ mol^{-1}) for the formation of micelle of SDS in different concentrations of mannitol at different temperatures

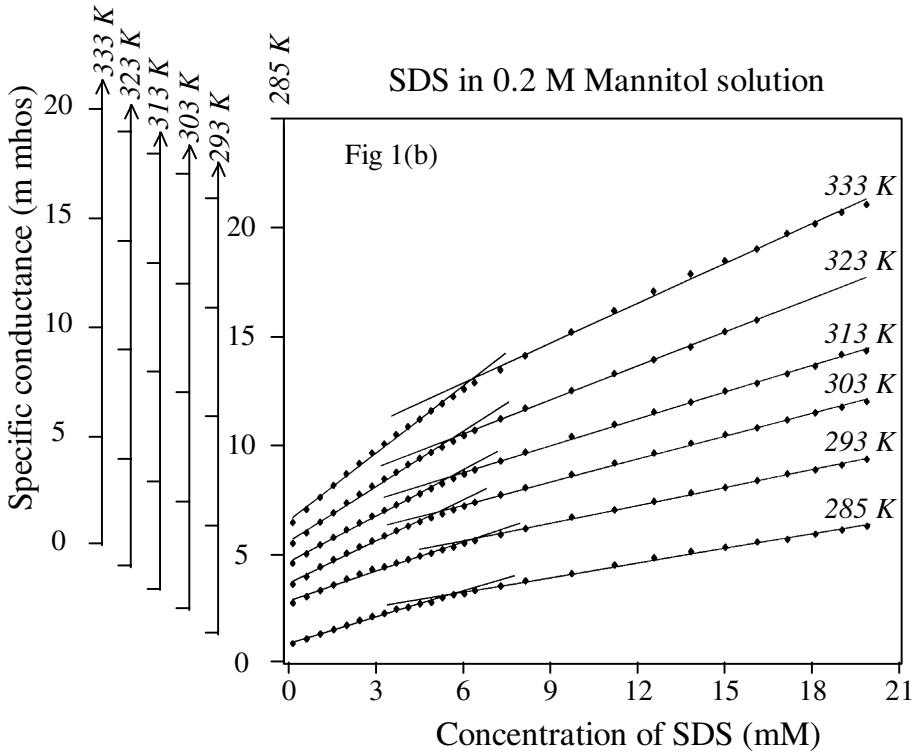
ΔG^o_{HP} (kJ mol^{-1})		Concentration of Mannitol				
Temp. K	SDS	0.1 M	0.2 M	0.3 M	0.6 M	0.8 M
285	-35.42	-34.64	-34.47	-35.24	-35.92	-37.03
293	-35.58	-35.09	-34.43	-35.02	-35.69	-36.74
303	-35.92	-36.39	-36.17	-35.73	-35.45	-35.15
313	-36.36	-37.01	-36.59	-36.20	-35.75	-35.28
323	-36.88	-37.62	-37.25	-36.62	-36.11	-35.57
333	-37.62	-38.28	-37.81	-37.36	-36.74	-36.24

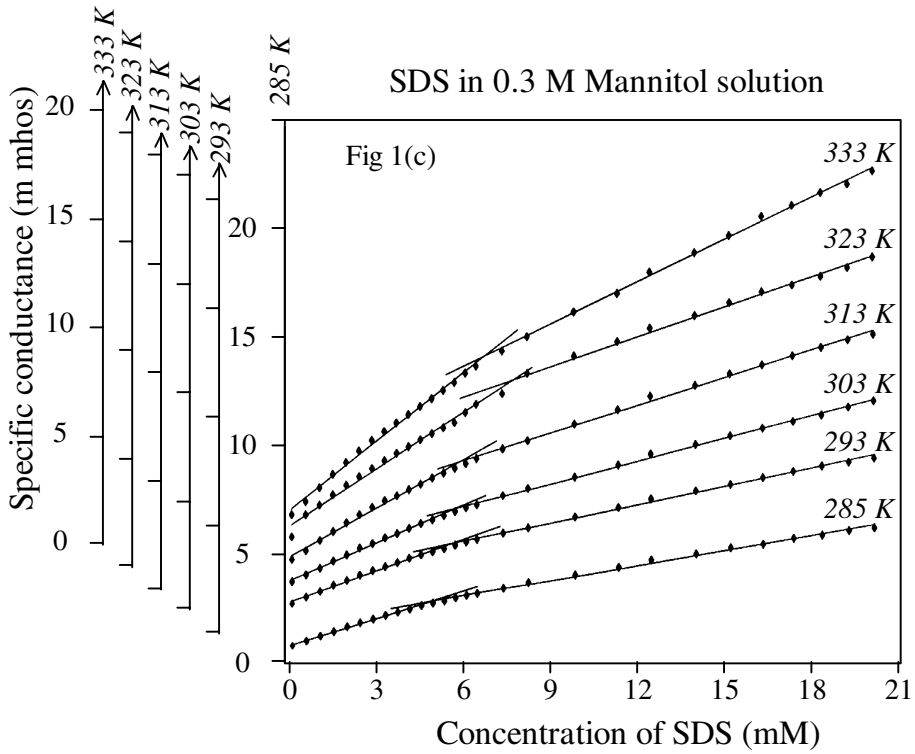
Table 4 Surface contributions, ΔG^o_s, (kJ mol^{-1}) for the formation of micelle of SDS in different concentrations of mannitol at different temperatures

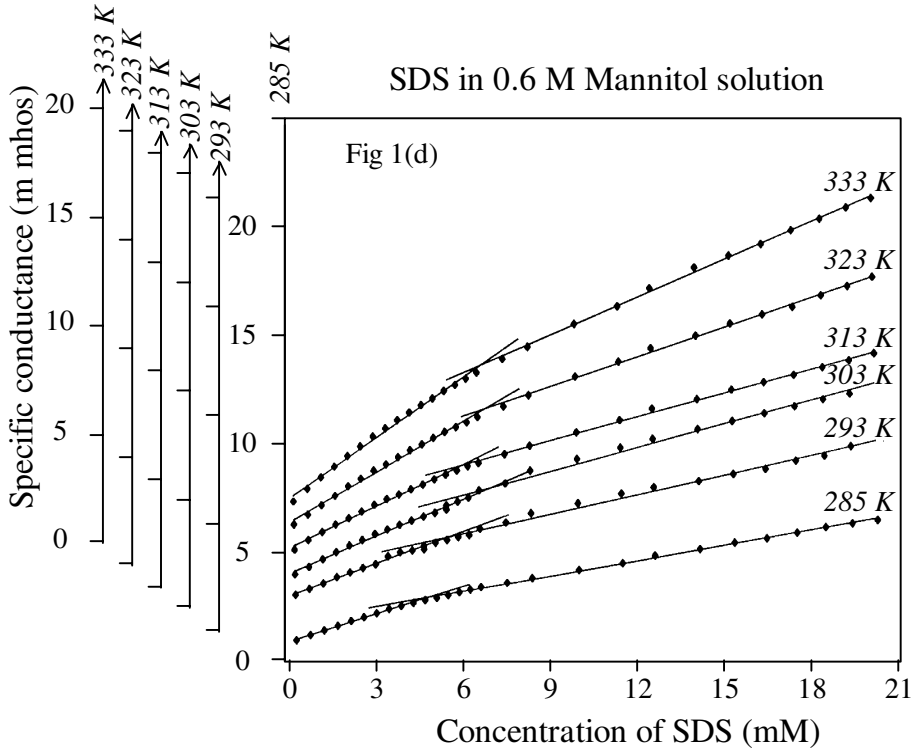
ΔG^o_s (kJ mol^{-1})		Concentration of Mannitol				
Temp. K	SDS	0.1 M	0.2 M	0.3 M	0.6 M	0.8 M
285	-14.40	-12.42	-12.44	-12.80	-13.29	-13.87
293	-14.03	-12.34	-12.13	-12.36	-12.66	-13.07
303	-13.79	-12.59	-12.48	-12.30	-12.10	-11.93
313	-13.68	-12.66	-12.44	-12.23	-11.86	-11.56
323	-13.67	-12.76	-12.53	-12.21	-11.72	-11.34
333	-13.52	-12.89	-12.61	-12.33	-11.73	-11.30

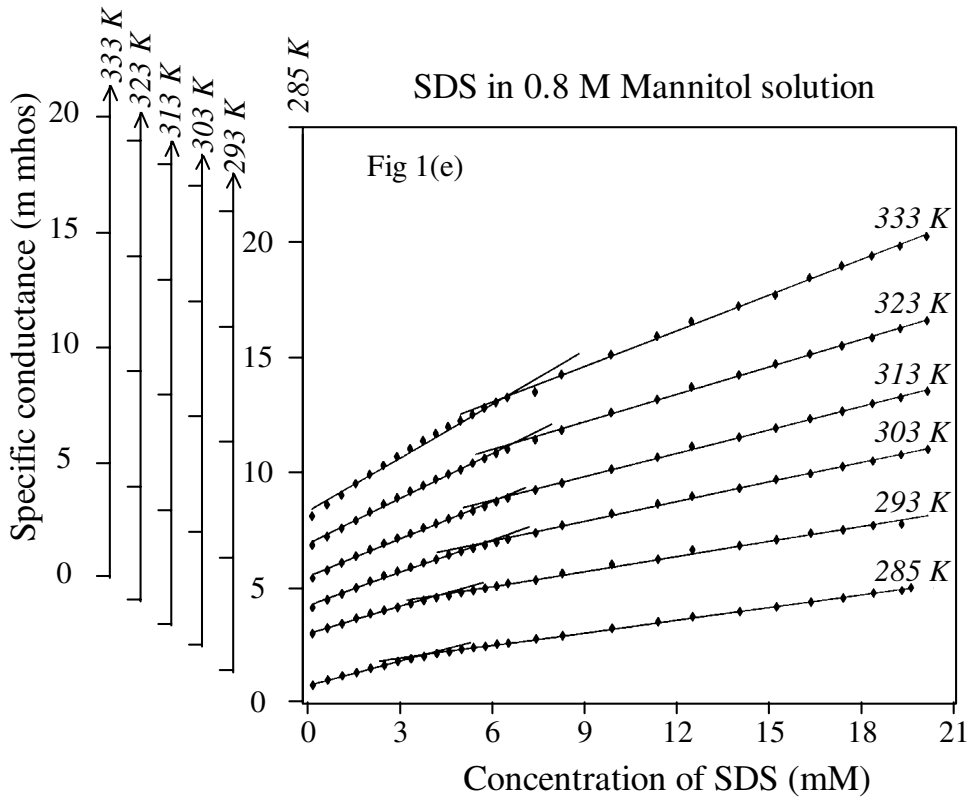
Figure 1. Plot of specific conductance versus concentration of SDS in various concentrations (a) 0.1 M (b) 0.2 M (c) 0.3 M (d) 0.6 M (e) 0.8 M of mannitol solution at different temperatures.






SDS in 0.3 M Mannitol solution
Fig 1(c)
333 K
323 K
313 K
303 K
293 K
285 K
Specific conductance (m mhos)
Concentration of SDS (mM)
0
5
10
15
20
0
3
6
9
12
15
18
21


SDS in 0.6 M Mannitol solution
Fig 1(d)
333 K
323 K
313 K
303 K
293 K
285 K
Specific conductance (m mhos)
Concentration of SDS (mM)
0
5
10
15
20
0
3
6
9
12
15
18
21



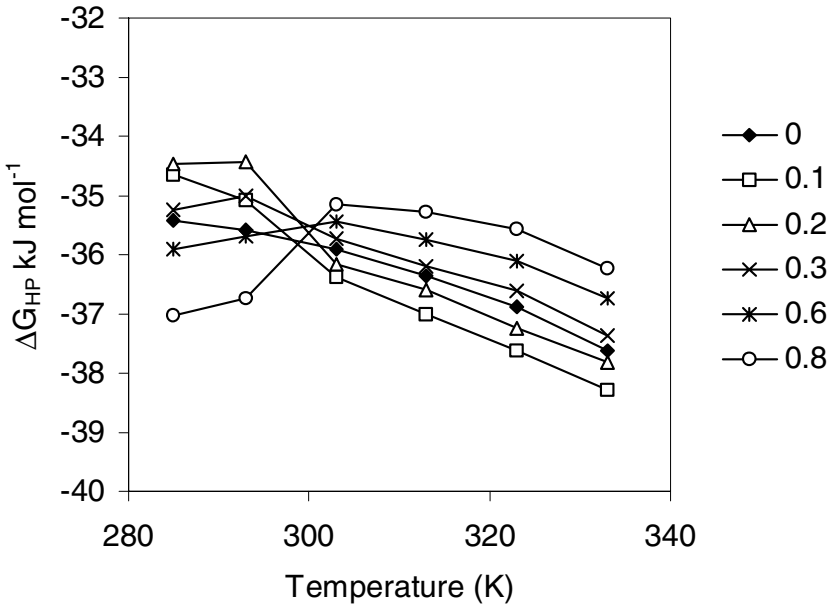


Figure 2. Free energy, ΔG^{o}_{HP}, of transfer of a hydrocarbon tail from medium to a micelle for SDS at different concentrations of mannitol.

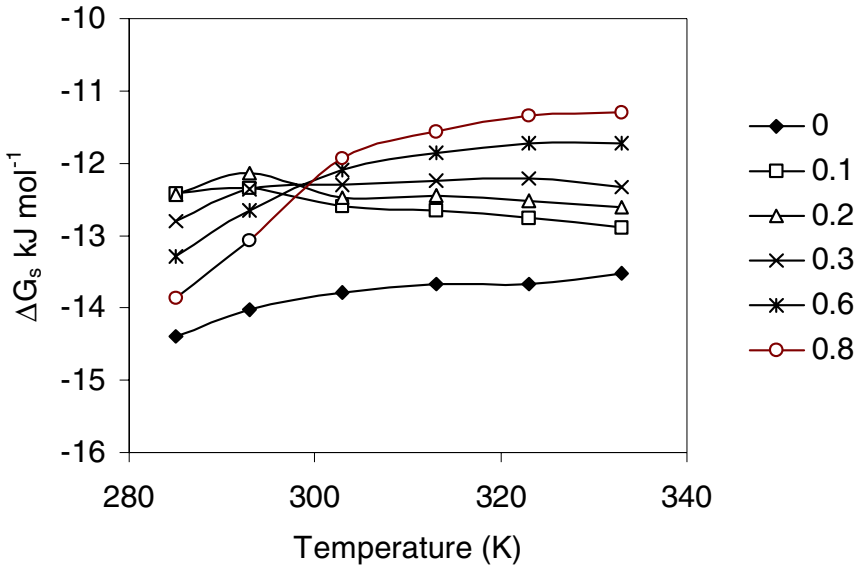


Figure 3. Free energy, ΔG^{o}_{s}, of the surface for SDS in different concentrations of mannitol at different temperatures.

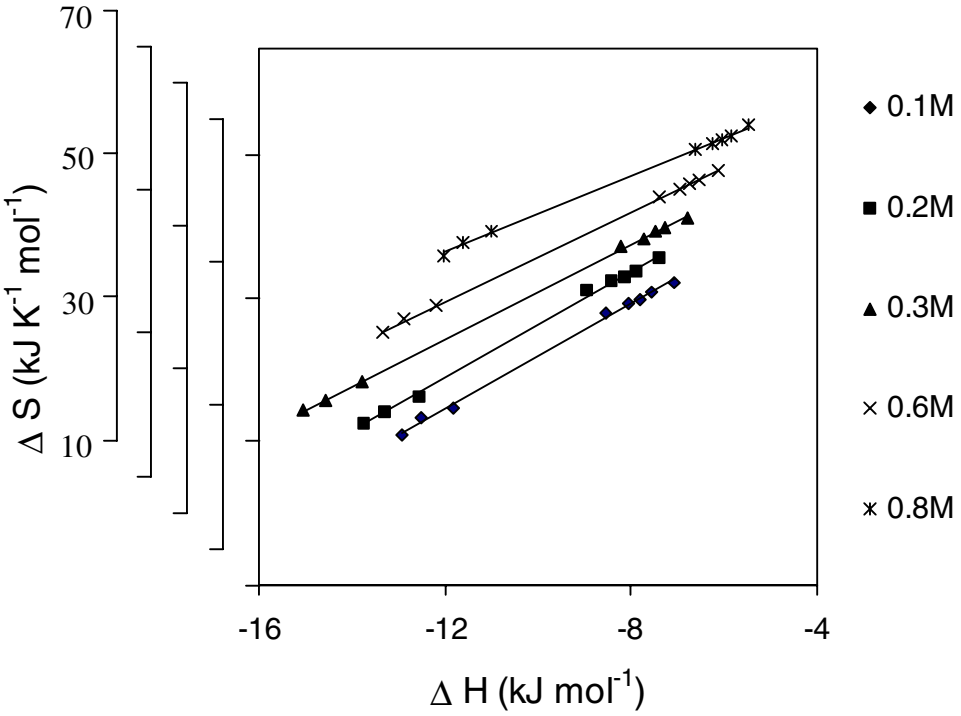


Figure 4. Enthalpy vs. Entropy.