Supplementary Information (SI) for Physical Chemistry Chemical Physics.
This journal is © the Owner Societies 2025

Supporting information:

Electrostatic control of Protein-Vesicle interactions in catanionic long-Chain ionic liquid systems: Insights from Human Serum Albumin

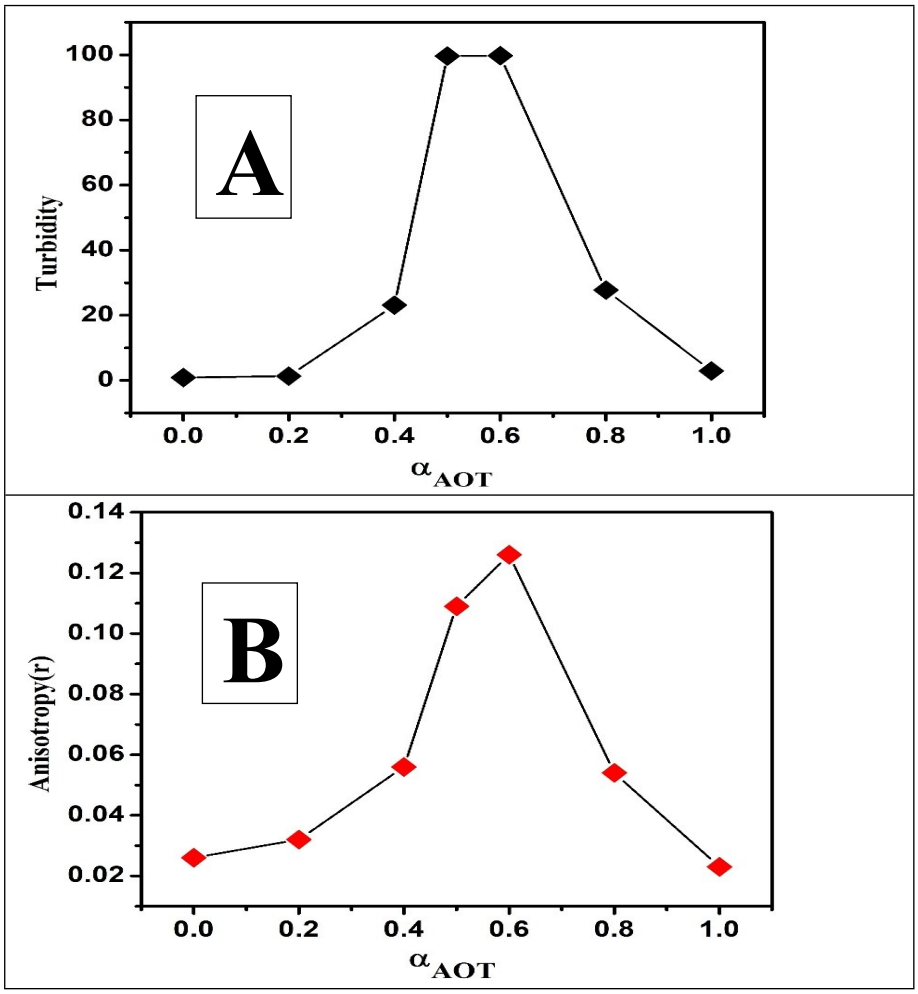
Raju Sardar, Soumili Dutta and Soumen Ghosh*

Centre for Surface Science, Physical Chemistry Section, Department of Chemistry,

Jadavpur University, Kolkata-700032

*E-mail of the corresponding author: gsoumen70@hotmail.com

1. Characterization of catanionic vesicle:



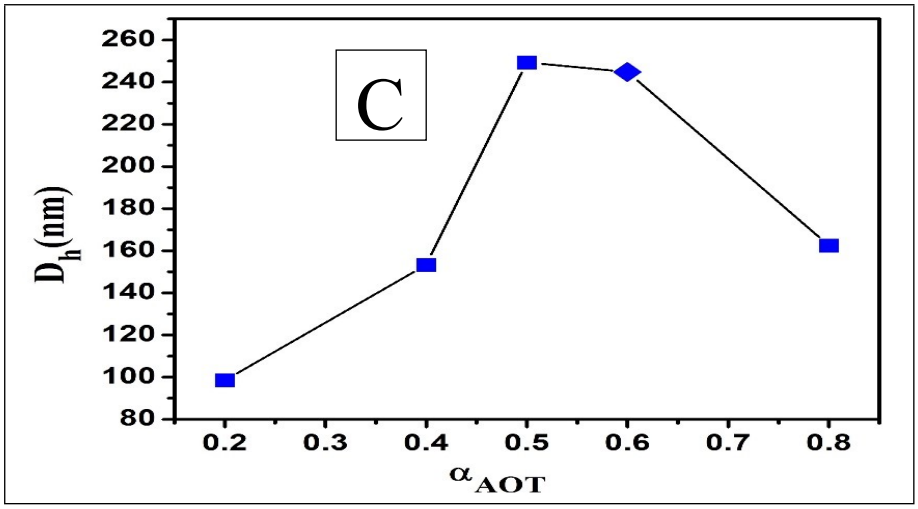


Fig. S1 (A) Variation in turbidity of aqueous [C_{16}Mim] [AOT] mixture at various mole fractions. (B) Variation in steady-state anisotropy of [C_{16}Mim] [AOT] mixture with varying mole fraction of AOT. (C) Change in hydrodynamic diameter (D_h) of [C_{16}Mim] [AOT] aggregate in different mole fractions.

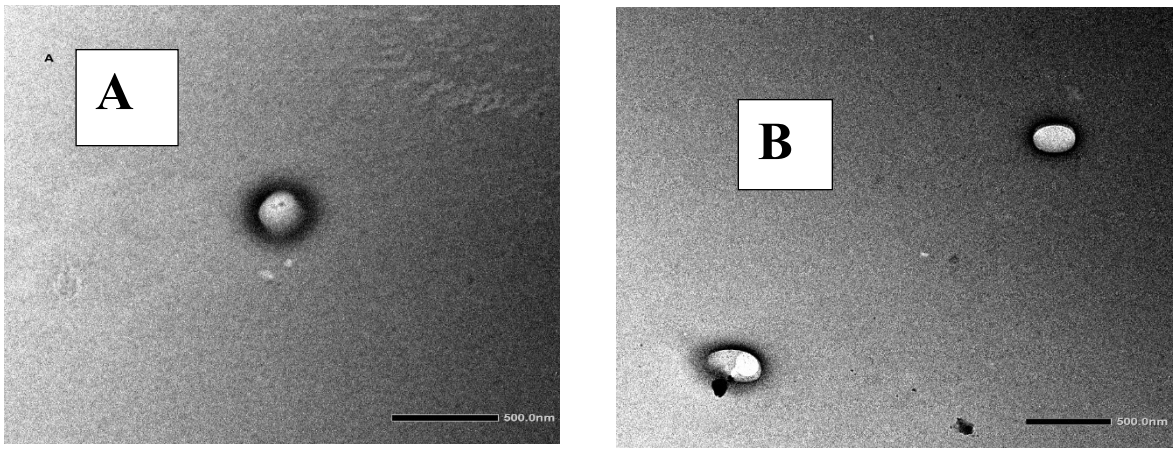


Fig. S2 TEM micrographs of [C_{16}Mim]/[AOT] mixture at (A) 0.5 mole fraction, and (B) 0.6 mole fraction of AOT.

(2) Absorbance spectra of HSA in the presence of [C_{16}Mim] [AOT].

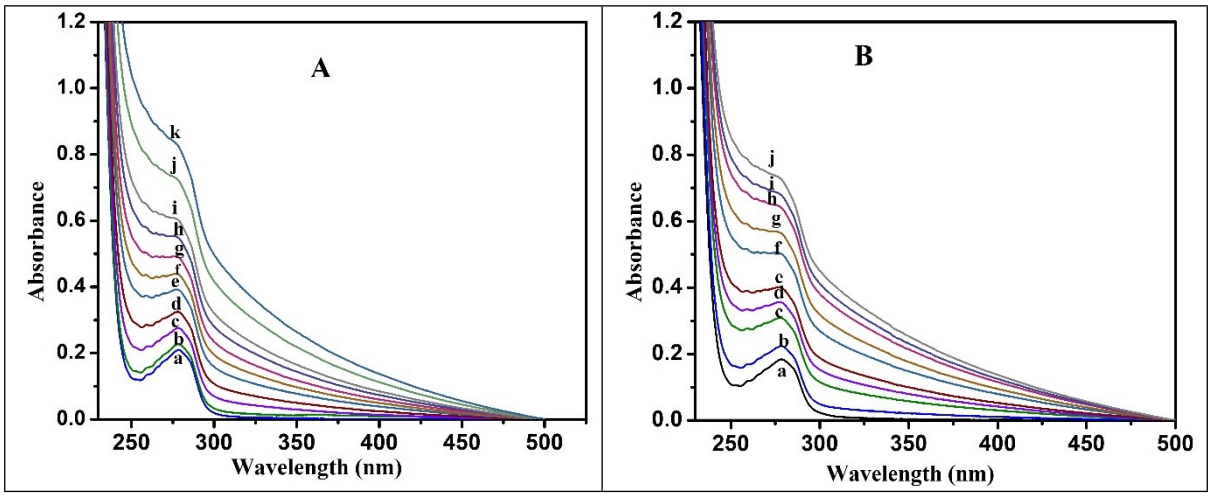


Fig. S3 Absorbance spectra of HSA in the presence of [C_{16}Mim] [AOT], (A) 0.5-mole fraction (a, b, c, d, e, f, g, h, i, j, k; 0.0, 0.05, 0.08, 0.12, 0.15, 0.18, 0.22, 0.28, 0.30, 0.33, 0.35 mM respectively), and (B) 0.6-mole fraction (a, b, c, d, e, f, g, h, i, j; 0.0, 0.04, 0.09, 0.11, 0.13, 0.18, 0.21, 0.26, 0.28. 0.32 mM respectively) of AOT.

(3) Table S1. Time-dependent fluorescence decay profile of HSA in [C_{16}Mim] [AOT] mixed vesicle system for χ_{AOT} =0.5 and χ_{AOT} =0.6, respectively.

[C_{16}Mim]/[AOT] (mM)(χ_{AOT} =0.5)	τ_1 (ns)	A_1 (%)	τ_2 (ns)	A_2 (%)	$<\tau>$ (ns)
0	1.64	24.17	5.94	75.83	3.64
0.04	1.39	21.97	5.10	78.03	3.21
0.07	1.03	21.75	5.04	78.25	2.74
0.14	0.61	19.72	4.77	80.82	2.04
0.20	0.21	24.22	4.57	75.78	0.77
0.36	0.15	29.72	4.52	70.28	0.48
0.49	0.071	41.08	4.37	58.92	0.17
[C_{16}Mim]/[AOT] (mM)(χ_{AOT} =0.6)					
0.014	1.35	21.86	5.45	78.14	3.28
0.03	1.10	19.23	5.11	80.77	3.04

0.07	**1.30**	**26.63**	**5.05**	**73.37**	**2.86**
0.09	**1.42**	**30.21**	**5.0**	**69.79**	**2.85**
0.11	**1.15**	**36.12**	**4.84**	**63.88**	**2.24**
0.24	**0.036**	**51.82**	**3.74**	**48.18**	**0.07**
0.49	**0.11**	**55.49**	**3.45**	**44.51**	**0.19**

(4) ITC profile [C_{16}Mim] [AOT] in the presence of HSA solution.

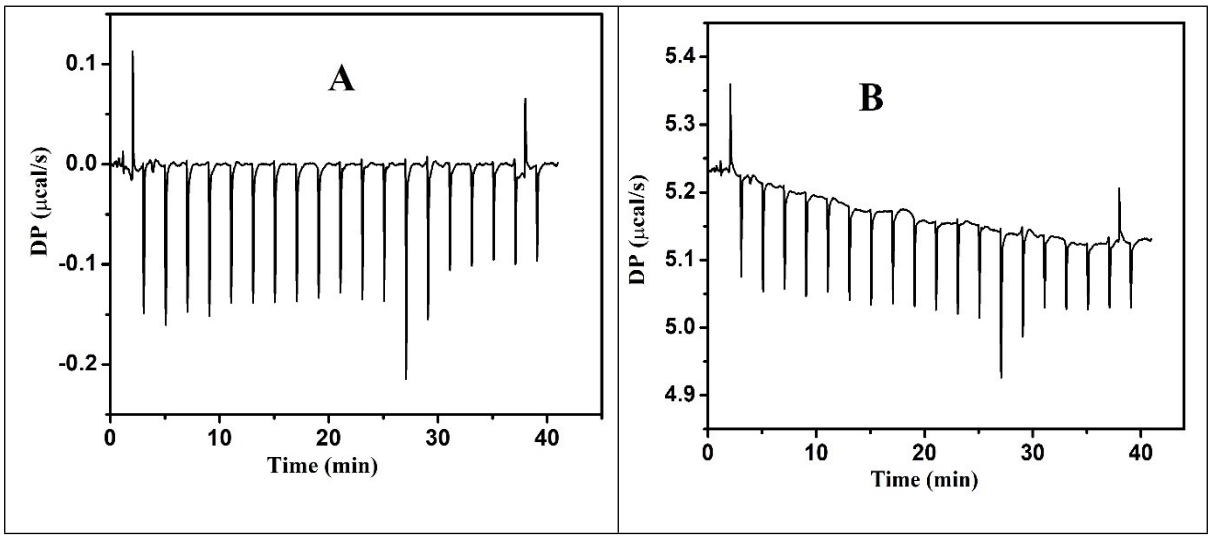


Fig. S4 ITC profile of titration of (A) 0.5, and (B) 0.6- mole fraction of [C_{16}Mim] [AOT] in HSA solution at 298 K.

(5) Variation of hydrodynamic diameter (D_h) of vesicle in the presence of different concentrations of HSA.

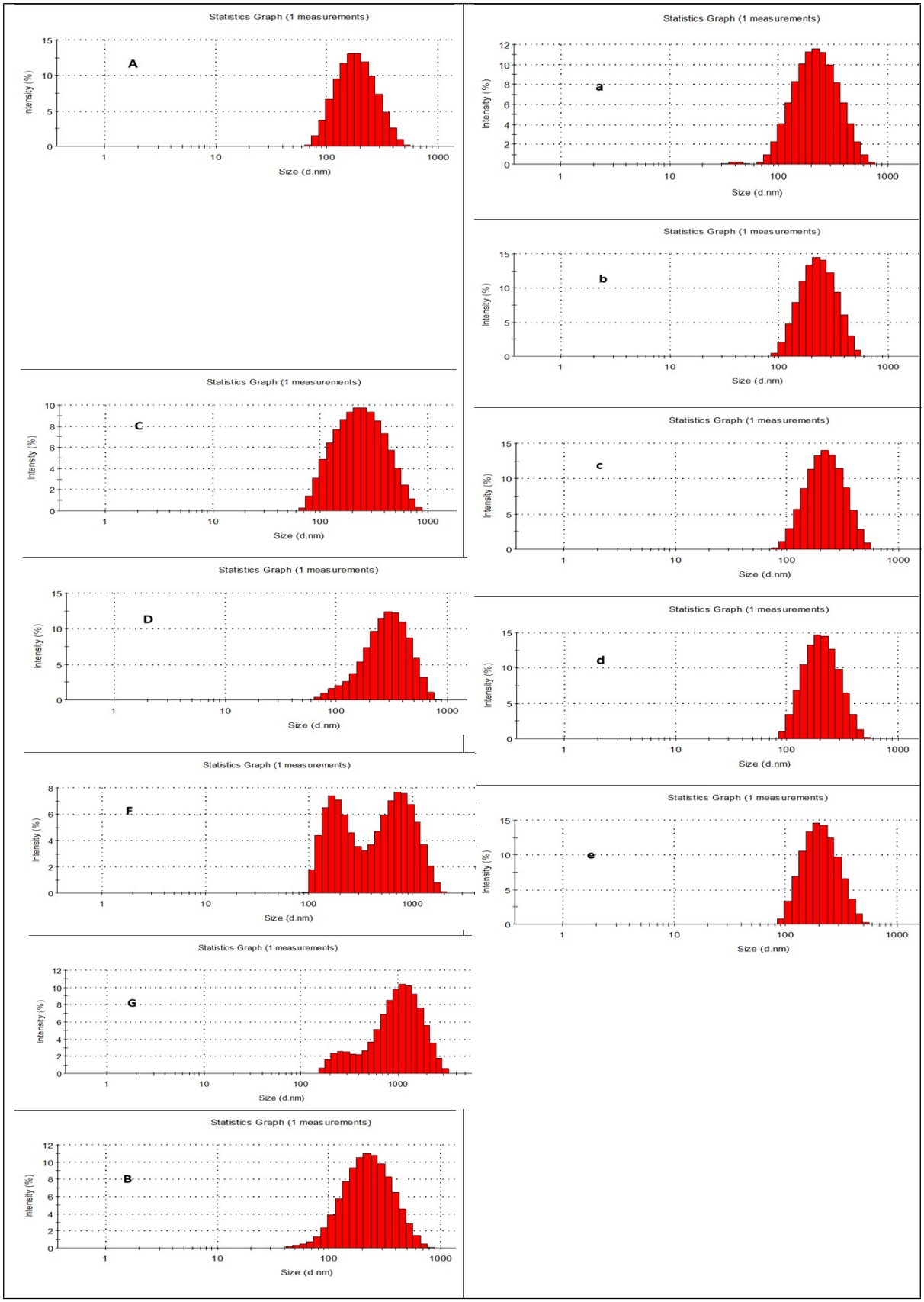


Fig. S5 Variation of hydrodynamic diameter (D_h) of [C_{16}Mim] [AOT] vesicle with increasing concentration of HSA; (A, B, C, D, E, F, G; 0.0, 0.36, 0.54, 1.07, 1.42, 2.21, 3.70

μM of HSA for the 0.5-mole fraction of AOT), and (a, b, c, d, e; 0.0, 0.48, 1.13, 2.45, 3.18 μM of HSA for the 0.6-mole fraction of AOT) respectively.

(6) Table S2. Variation of α-helix contents of HSA in the presence of various amounts of [C_{16}Mim] [AOT] (for χ_{AOT} =0.5 and χ_{AOT} =0.6) in pH 7.4, at 298 K.

[C_{16}Mim] [AOT] (χ_{AOT} =0.5) (mM)	α–helix (%)	[C_{16}Mim] [AOT] (χ_{AOT} =0.6) (mM)	α–helix (%)
0	60.85	0	60.85
0.002	60.85	0.003	59.28
0.011	60.75	0.021	60.21
0.022	60.65	0.052	60.038
0.102	60.53	0.076	59.98
0.107	60.71	0.133	60.09
0.117	60.69	0.136	59.78
0.133	60.48	0.166	59.48
0.186	60.25		