Article:
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Figure captions

Figure 1 – Schematic diagrams, showing the structure of mixed interfacial layers of protein + homogeneously charged polysaccharide, at different levels of polysaccharide charge, as inferred from the SCF calculations: a) lightly charged chains, b) chains having the optimum level of charge and c) highly charged polysaccharides.

Figure 2 – Interfacial layers consisting of protein and a non-uniformly charged polysaccharide. Polysaccharide chains comprise of a short, highly charged part (20 monomers) and a longer lightly charged section (480 monomers). Different diagrams show the structure of the layers at different level of contrast between the charge density of the two blocks, while maintaining the same overall negative charge for the chains. a) comparable charge densities b) high level of contrast c) the lightly charged section is electrically neutral.

Figure 3 – Interaction potential induced by the overlap of adsorbed protein + polysaccharide layers. Polysaccharides are evenly charged and have a charge density of -0.0496e/monomer (short dashed line), -0.1e/monomer (dotted-dashed line), -0.5e/monomer (long dashed line) and -1e/monomer (solid line). Fig. 3a) Graphs for two flat surfaces and Fig. 3b) Interaction potential curves for spherical droplets of size 1 μm. In both graphs the grey line represents the results obtained for layers consisting of protein only.

Figure 4 – The density profile variation, Fig. 4a) Polysaccharide, Fig. 4b) Protein, plotted across the gap between the two surfaces, for the same system as that in Fig. 3, involving the polyelectrolyte chains with a charge density of -1e/monomer. Fig. 4b also shows the variation of the density profile of the protein in the absence of the polysaccharide for comparison (dotted line).

Figure 5 – The same as the graphs in Fig. 3, but now with polysaccharide chains all having the same charge but comprising of a long and a small block, with two contrasting values of charge density. The charge densities of the short and long sections, in units of e per monomer, are a) -0.0496 / -0.0496, b) -0.52 / -0.03, c) -0.7 / -0.0225, d) -1.0 / -0.01 and e) -1.24 / 0, respectively. The inset shows the interaction potential in more detail at particle separations close to the point of overlap of the two layers.

Figure 6 – The same as graphs in Fig. 5, but this time with the charge density of the long blocks maintained at -0.01e/monomer, while that of the short blocks is varied: a) -0.25e/monomer, b) -0.5e/monomer , c) -1e/monomer and d) -3e/monomer. Grey line represent interactions mediate by protein only layers.

Figure 7 – Inter-particle interaction potential, plotted against separation distance in systems simultaneously containing protein, a uniformly charged polysaccharide and a further heterogeneously charged polyelectrolyte (solid line). The graphs for the layers consisting of protein + each individual polysaccharide on their own are also included: protein + polysaccharide with non-even charge distribution (grey dashed line), protein + uniformly charged polysaccharide (black dashed line).

Figure 1

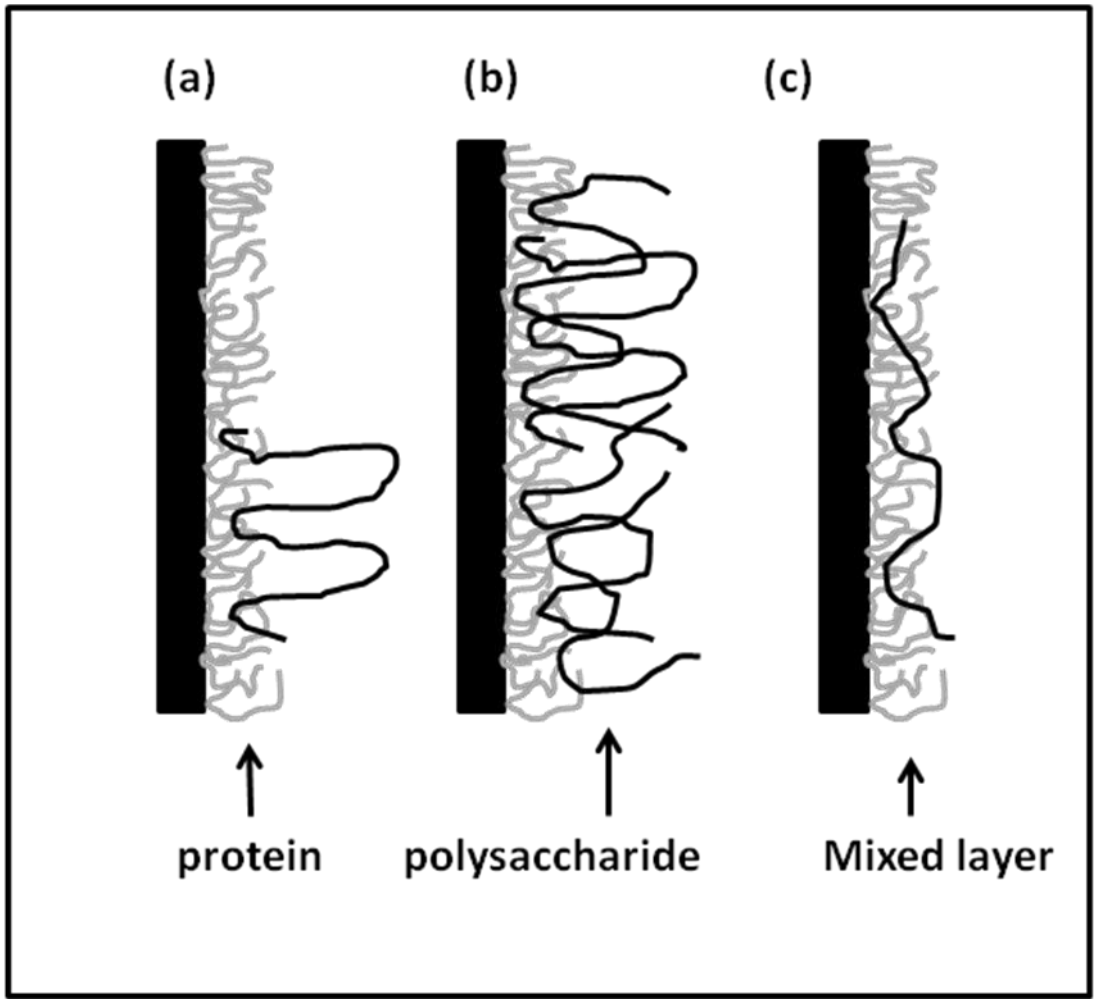


Figure 2

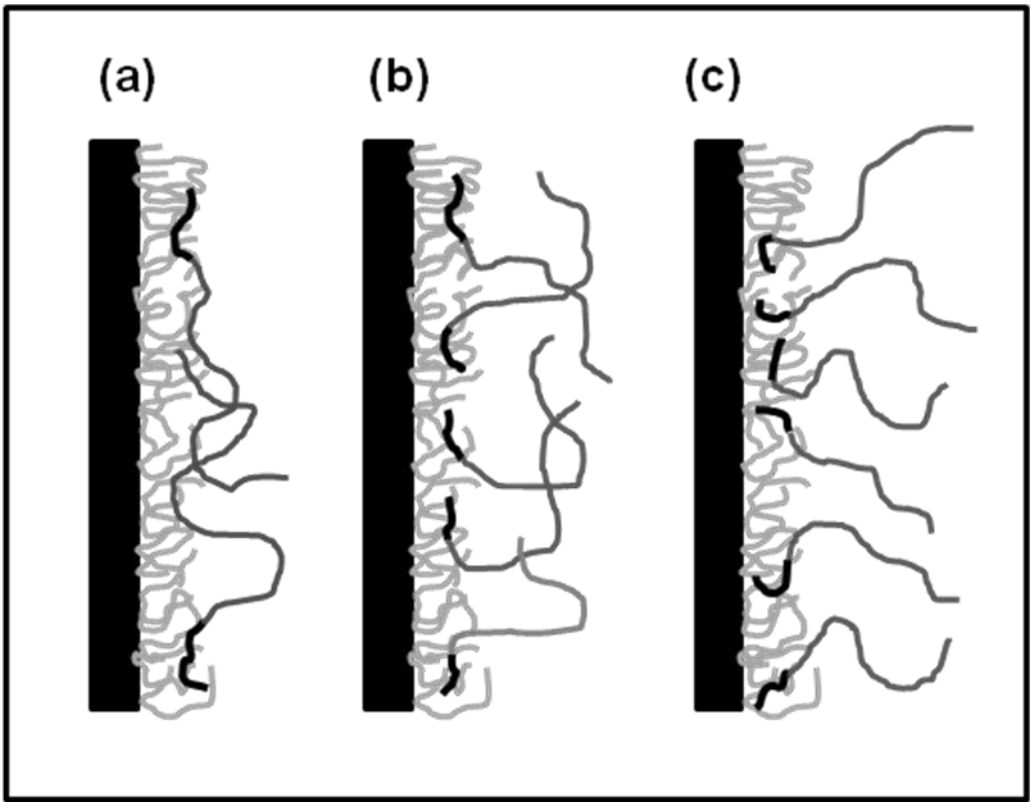


Figure 3a

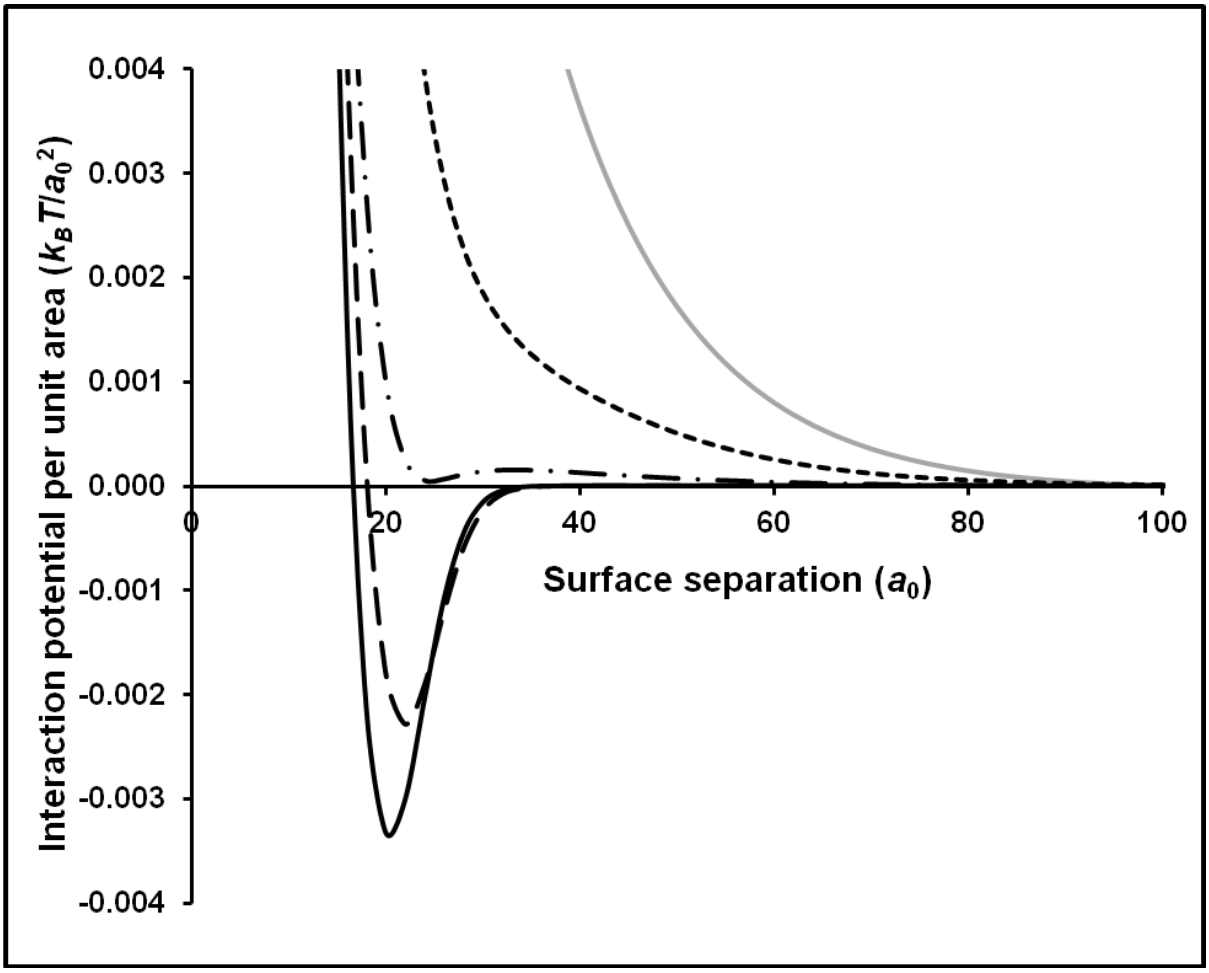

0.004
0.003
0.002
0.001
0.000
-0.001
-0.002
-0.003
-0.004
0
20
40
60
80
100
Interaction potential per unit area ($k_B T/a_0^2$)
Surface separation (a_0)

Figure 3b

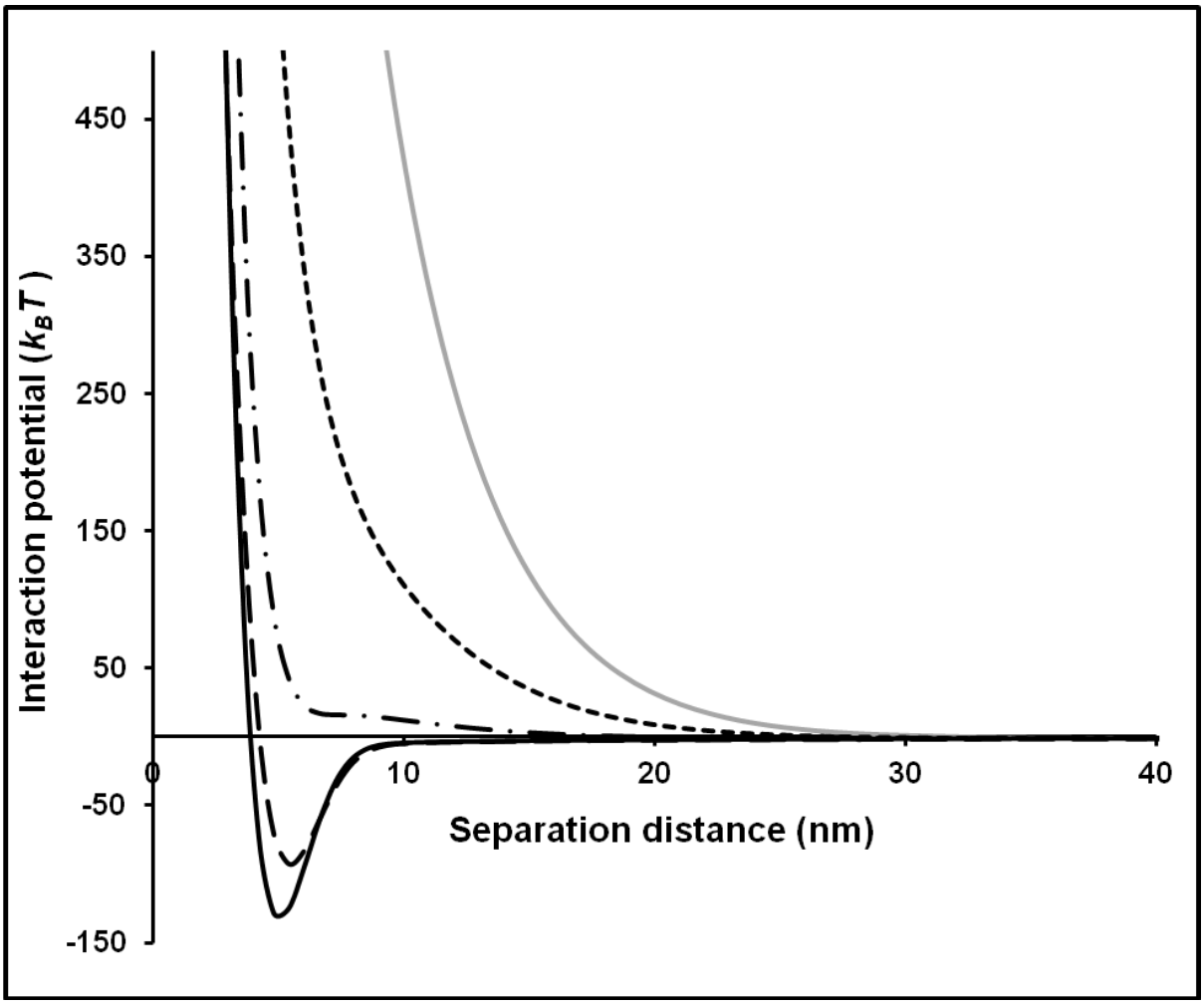

450
350
250
150
50
-50
-150
Interaction potential (k_BT)
0
10
20
30
40
Separation distance (nm)

Figure 4a

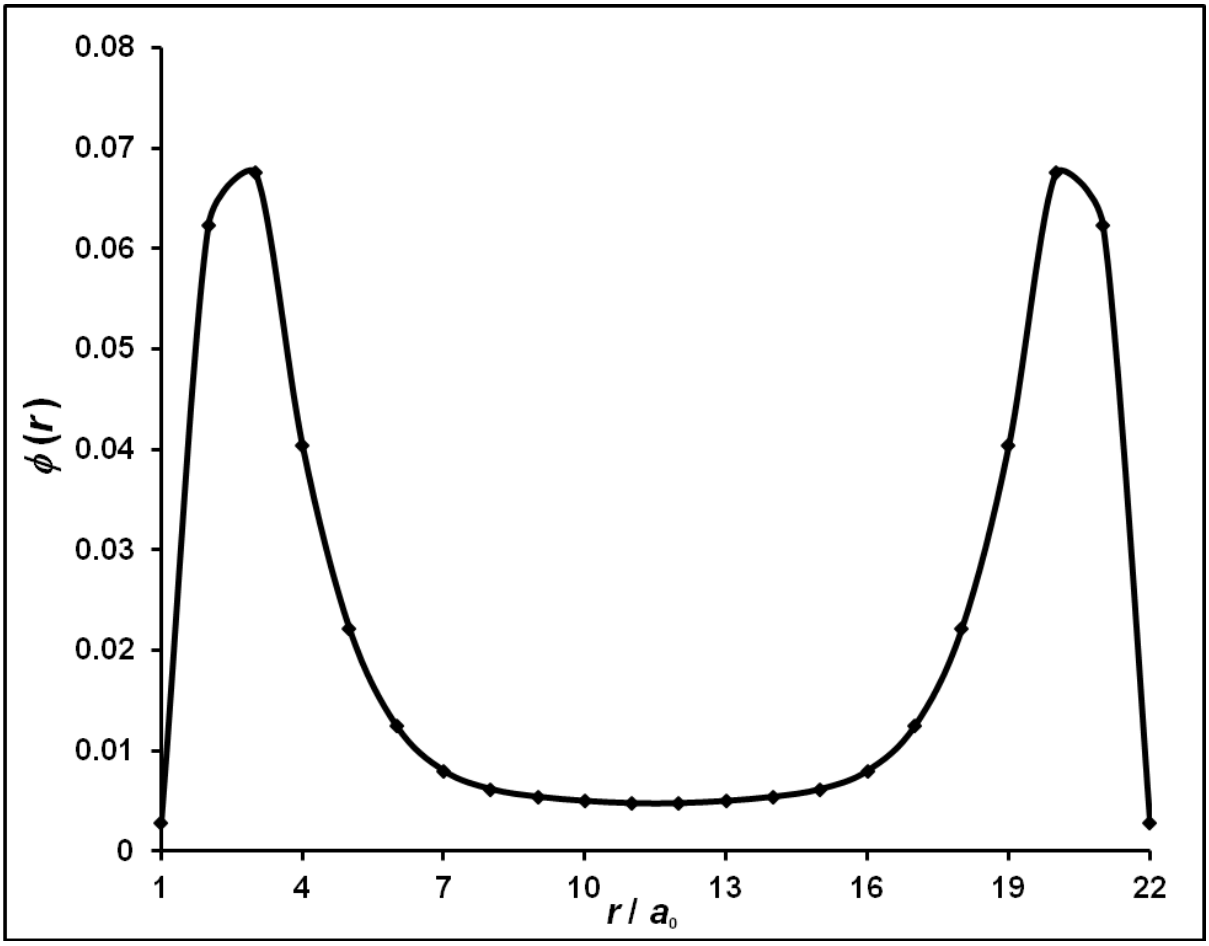


Figure 4b

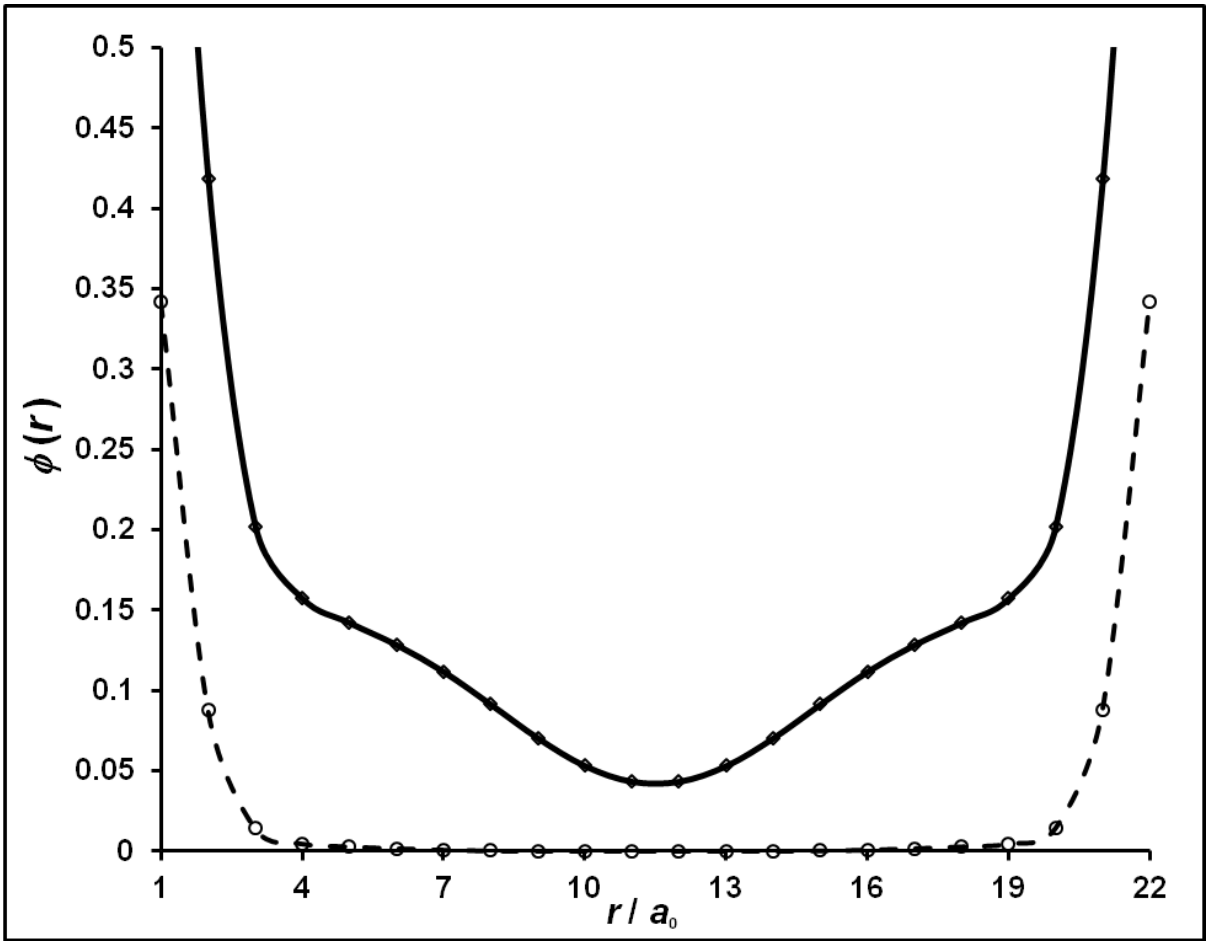


Figure 5

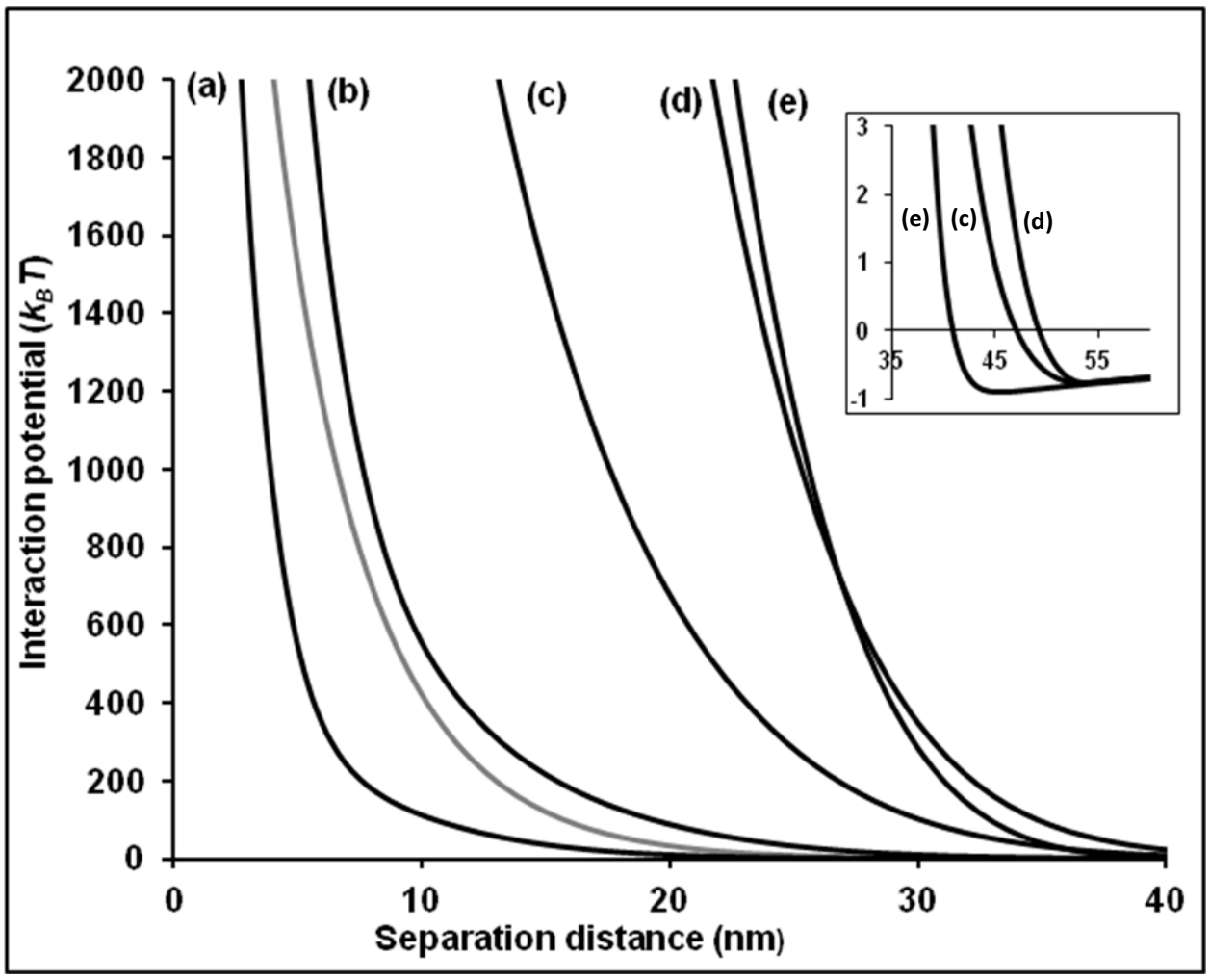

(a)
(b)
(c)
(d)
(e)
Interaction potential ($k_B T$)
Separation distance (nm)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
10
20
30
40
3
2
1
0
-1
35
45
55
(e)
(c)
(d)

Figure 6

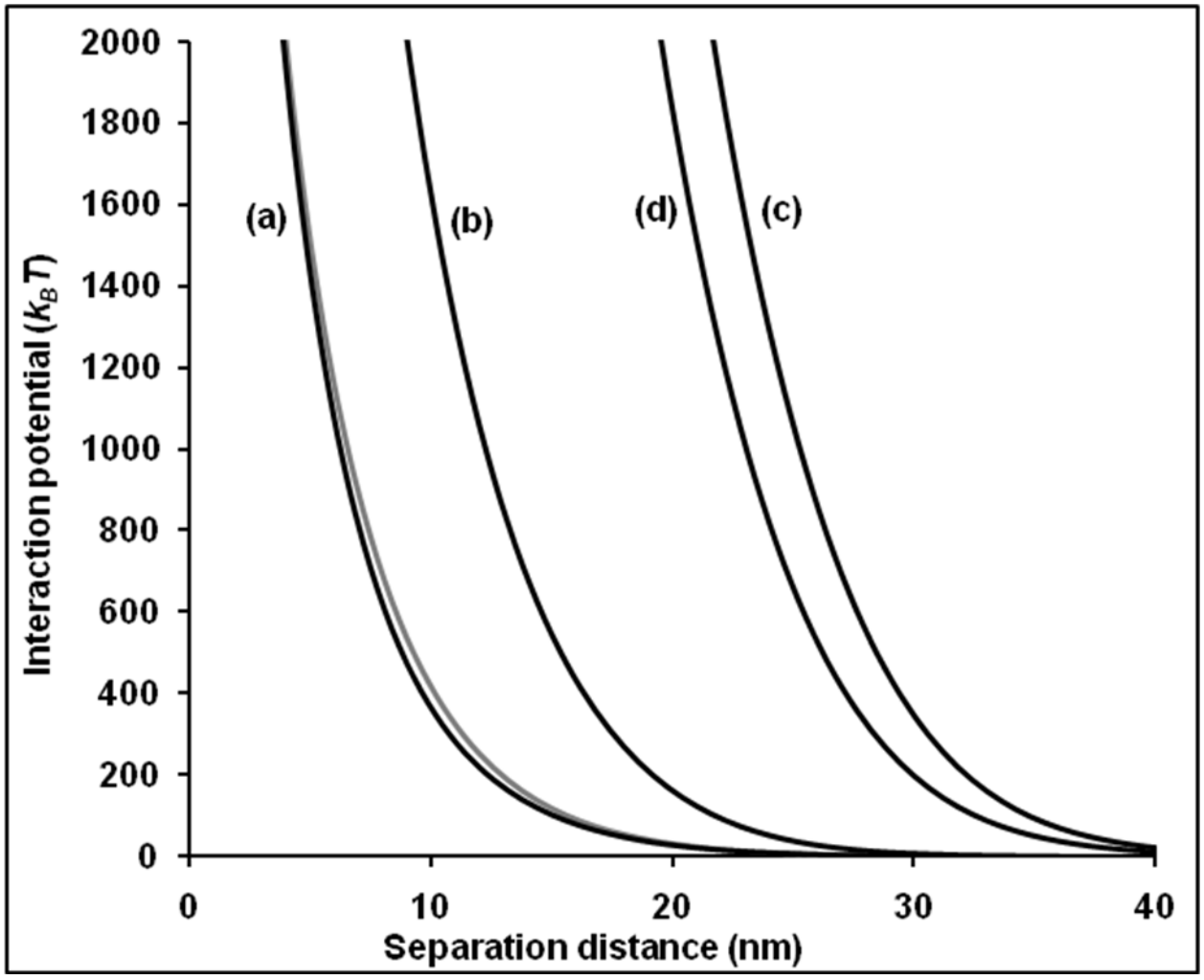
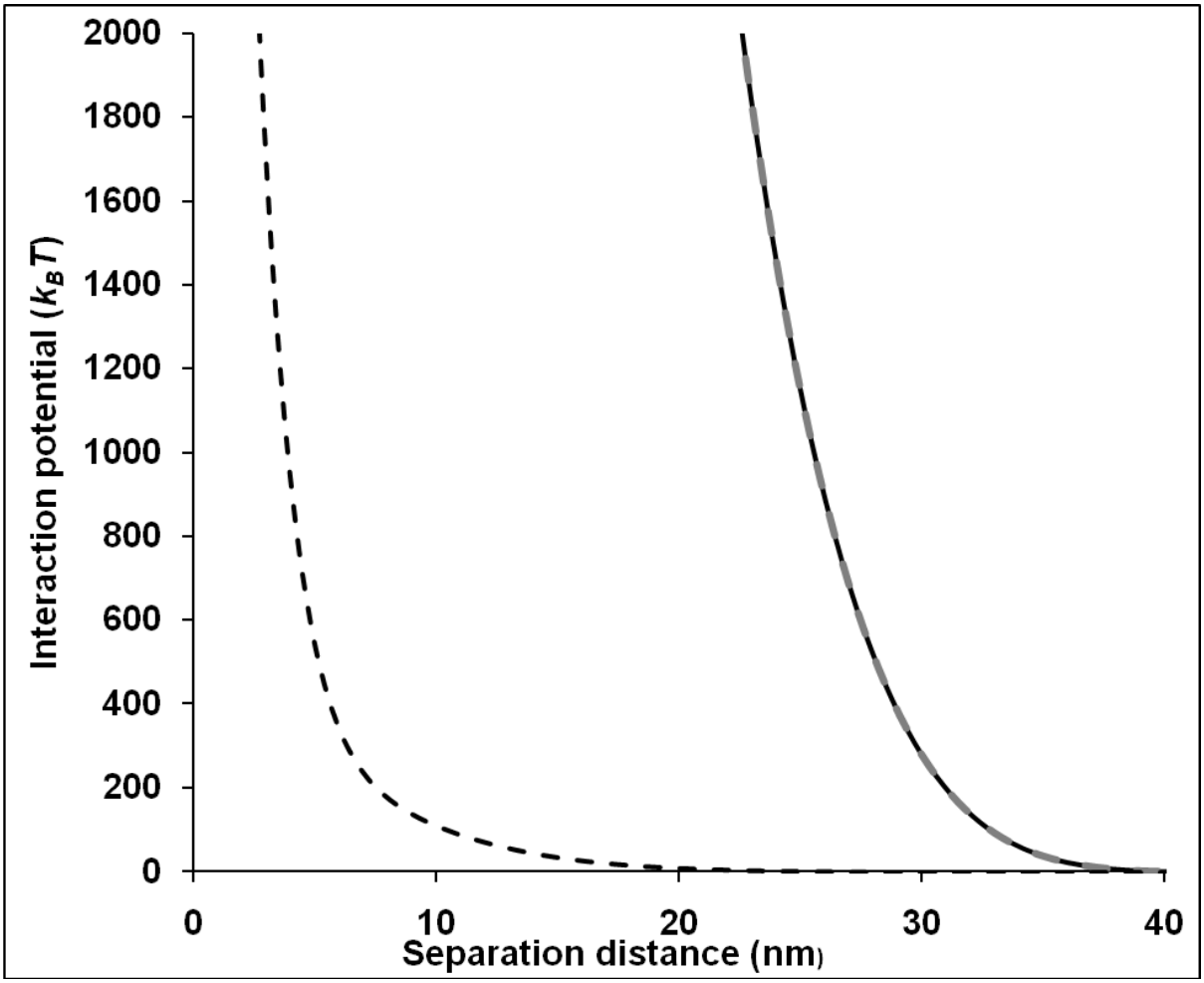

2000
1800
1600
1400
1200
1000
800
600
400
200
0
Interaction potential (k_BT)
(a)
(b)
(d)
(c)
0
10
20
30
40
Separation distance (nm)

Figure 7


2000
1800
1600
1400
1200
1000
800
600
400
200
0
Interaction potential (k_BT)
0
10
20
30
40
Separation distance (nm)