Module 6: "Forces in Colloidal Systems"

Lecture 32:

The Lecture Contains:

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Acid Base component

Energy per unit area for flat plate because of acid base interaction as a function of distance can be written as

$$G^{AB} = \Delta G_0^{AB} \exp\left(-\frac{d_0 - D}{\lambda}\right)$$

Where λ is the correlation length for acid base interaction, d_0 is the cut off distance and ΔG_0^{AB} is defined as

$$\Delta G_0^{AB} = \gamma_{12}^{AB} - \gamma_{13}^{AB} - \gamma_{23}^{AB}$$

It may be noted that λ is an important parameter. Higher the value of λ, larger would be the range of AB interaction and lower the value of λ, shorter will be the range of $A - B$ interaction.

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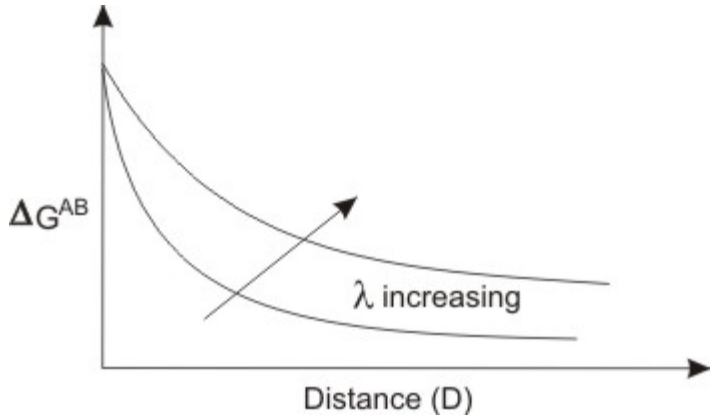

Fig 8.19:

Using the above expression of acid base interaction for flat plate, we can derive the acid base interaction energy for spherical particles using Deryaguin's approximation:

$$\phi^{AB} = \pi R \lambda \Delta G^{AB} \, e^{\frac{d_0 - D}{\lambda}}$$

When particles are of different radius R can be replaced by $\frac{2R_1R_2}{R_1 + R_2}$. Thus,

$$\phi^{AB} = \frac{2\pi R_1 R_2}{R_1 + R_2} \lambda \Delta G^{AB} e^{\frac{d_0 - D}{\lambda}}$$

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