

| Non ionic surfactants | | |
|---|-----|----|
| | yes | no |
| Precipitate below cloud point | | x |
| Are charged | | x |
| Have high aggregation number | x | |
| Aggregation number does not depend on T | | x |

A suspension of spherical silica particles ($n_p=1.46$) in water ($n_s=1.33$) scatters 1% of light at 400 nm. Radius of the particles is 20 nm.

Ex 1 What is the percentage of scattering at 800 nm?

Ex 2 What is the percentage of scattering if size increases to 25 nm?

$$\% = \frac{I_s}{I_0} * 100 \quad \% = \alpha \frac{r^6}{\lambda^4} \left(\frac{m^2 - 1}{m^2 + 2} \right)^2 \quad m = n_p/n_s$$

Ex 1

$$\%_1 = \alpha \frac{r^6}{\lambda_1^4} \left(\frac{m^2 - 1}{m^2 + 2} \right)^2 \quad \%_2 = \alpha \frac{r^6}{\lambda_2^4} \left(\frac{m^2 - 1}{m^2 + 2} \right)^2 \quad \frac{\%_2}{\%_1} = \frac{\lambda_1^4}{\lambda_2^4} \quad \frac{\%_2}{\%_1} = 0.5^4 \quad \%_2 = 0.0625 * 1 = 0.0625\%$$

Ex 2

$$\%_1 = \alpha \frac{r_1^6}{\lambda^4} \left(\frac{m^2 - 1}{m^2 + 2} \right)^2 \quad \%_2 = \alpha \frac{r_2^6}{\lambda^4} \left(\frac{m^2 - 1}{m^2 + 2} \right)^2 \quad \frac{\%_2}{\%_1} = \frac{r_2^6}{r_1^6} \quad \frac{\%_2}{\%_1} = 1.25^6 \quad \%_2 = 3.81 * 1 = 3.81\%$$