

Supplementary Information for Hierarchical assembly of pH-responsive surfactant-cyclodextrin complexes

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S1. Thermogravimetry

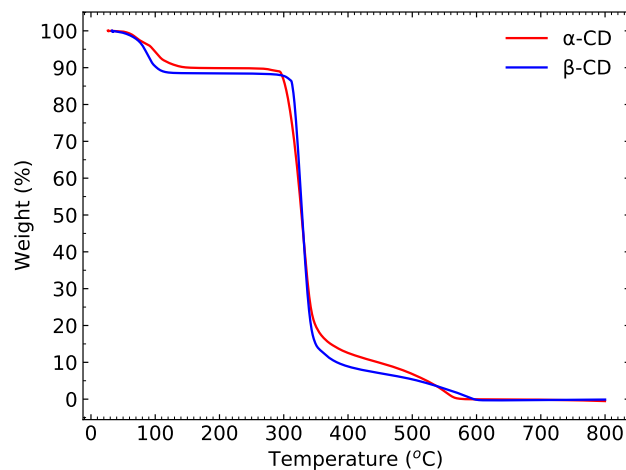


Figure S1: Thermogravimetric analysis of α -cyclodextrin and β -cyclodextrin.

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S2. Phase behaviour

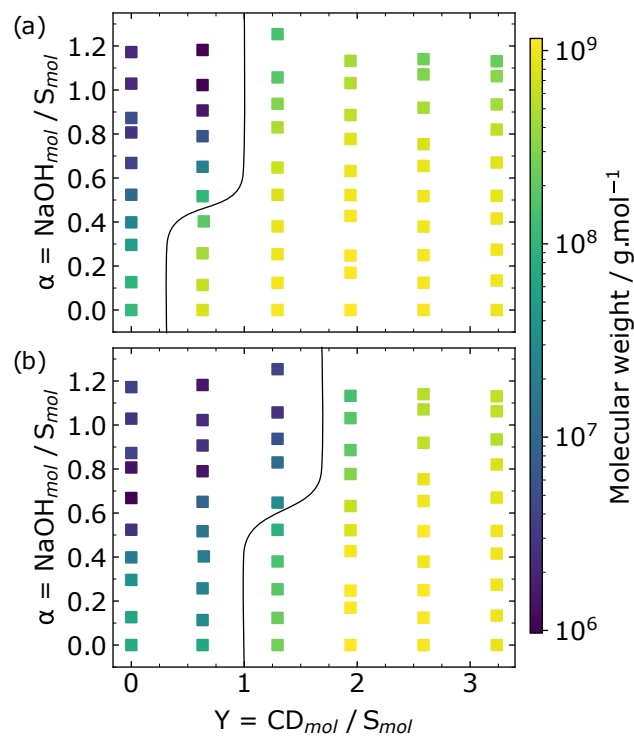


Figure S2: Phase behaviour of $\text{C}_{12}\text{E}_5\text{Ac-}\beta\text{CD}$ before (a) and after (b) heating $\text{C}_{12}\text{E}_5\text{Ac-}\beta\text{CD}$

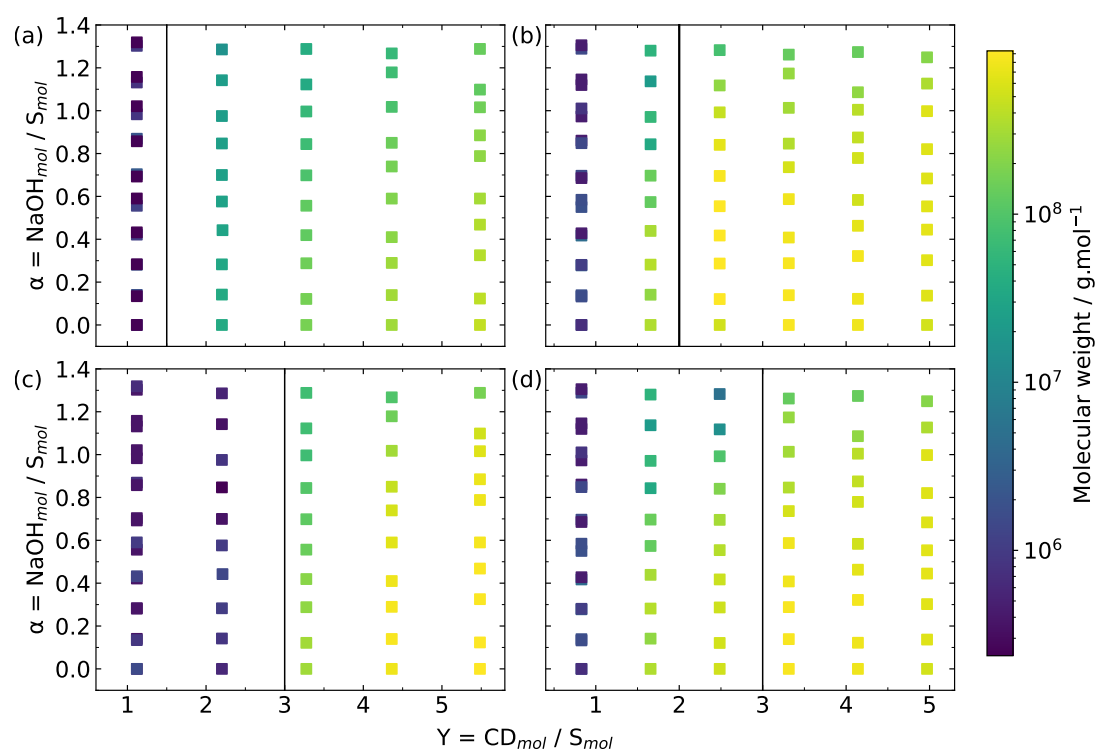


Figure S3: $\text{C}_{12}\text{E}_{10}\text{Ac}-\alpha\text{CD}$ before (a) and after heating (c) and $\text{C}_{12}\text{E}_{10}\text{Ac}-\beta\text{CD}$ before (b) and after heating (d).

S3. Thermodynamic parameters obtained from volumetric studies

Table T1: Thermodynamic parameters of different surfactant-cyclodextrin complexes obtained from the volumetric fit.

Surfactant	Cyclodextrin	$\alpha = 0$			$\alpha = 1$		
		n	K (10^3 kg mol^{-1})	ΔV ($\text{cm}^3 \text{ mol}^{-1}$)	n	K (10^3 kg mol^{-1})	ΔV ($\text{cm}^3 \text{ mol}^{-1}$)
C ₁₂ E ₅ Ac	α CD	1.17 \pm 0.1	6.23 \pm 0.46	-8.16 \pm 0.1	1.50 \pm 0.1	3.49 \pm 0.12	-10.67 \pm 0.23
C ₁₂ E ₁₀ Ac		1.71 \pm 0.2	7.62 \pm 0.31	-8.29 \pm 0.1	0.54 \pm 0.2	5.76 \pm 0.2	-8.87 \pm 0.16
C ₁₂ E ₅ Ac	β CD	0.8 \pm 0.1	5.68 \pm 0.08	5.30 \pm 0.1	1.47 \pm 0.1	11.25 \pm 1.04	14.45 \pm 1.93
C ₁₂ E ₁₀ Ac		1 \pm 0.1	8.50 \pm 0.96	5.34 \pm 0.3	0.85 \pm 0.1	15.1 \pm 0.42	14.16 \pm 1.13

S4. Small-angle Neutron Scattering (SANS)

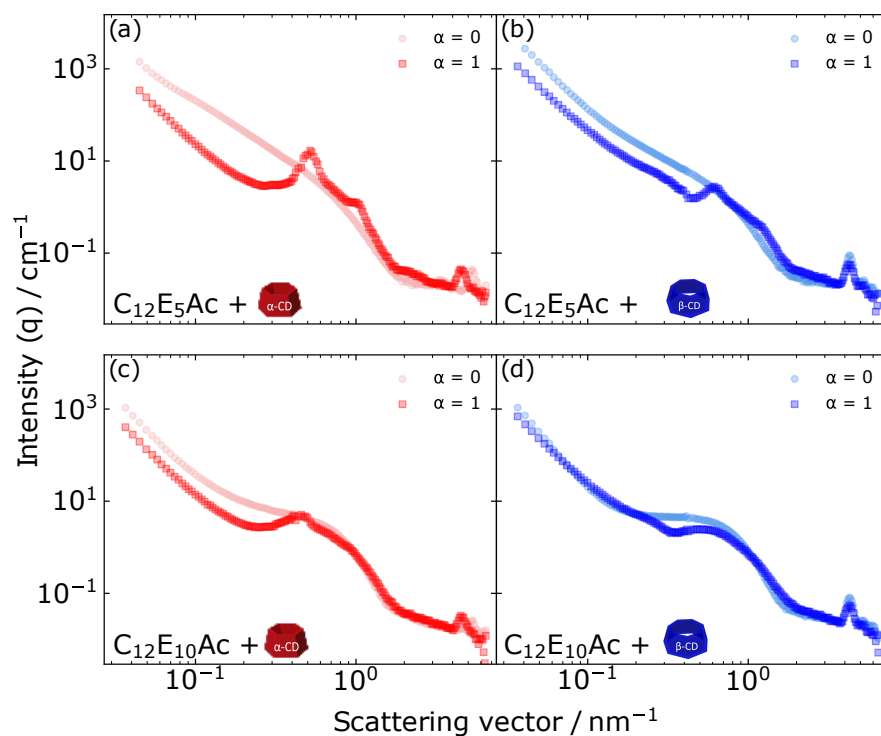


Figure S4: SANS curves of Ratio [CD]/[Surfactant] = 1, degree of ionization $\alpha=0$ and $\alpha=1$. (a) C₁₂E₅Ac- α CD, (b) C₁₂E₅Ac- β CD, (c) C₁₂E₁₀Ac- α CD and (d) C₁₂E₁₀Ac- β CD. Measurements recorded on D22 at ILL.

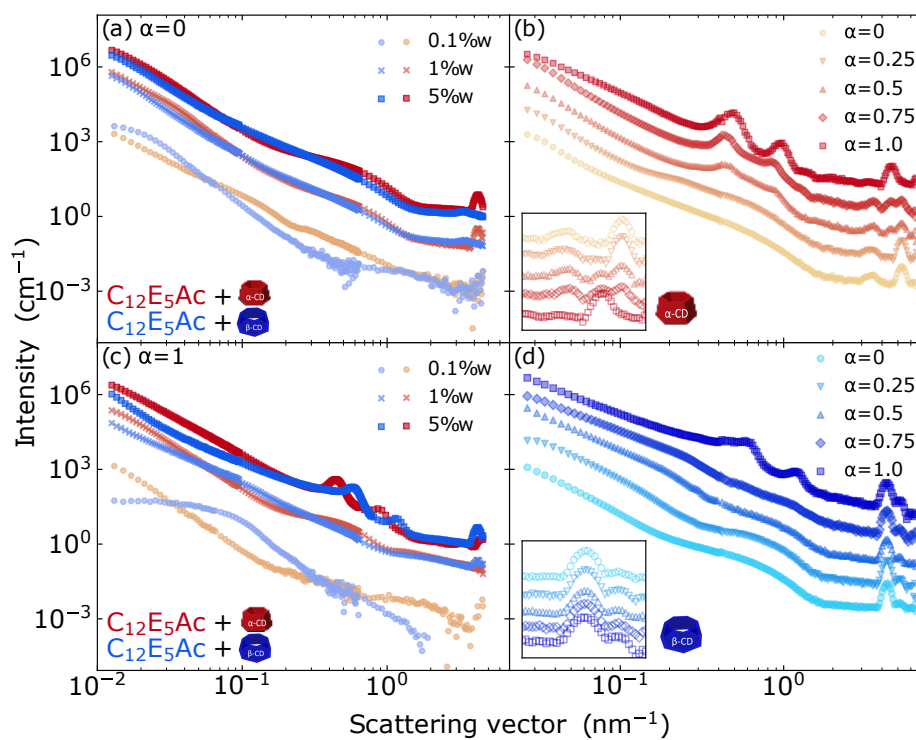


Figure S5: SANS curves profiles of $C_{12}E_5Ac - \beta CD$ (Ratio $[CD]/[Surfactant] = 2$) at different concentrations: (a) $\alpha=0$ (nonionized), (c) $\alpha=1$ (ionized). Comparison of βCD with ionized $C_{12}E_5Ac$ (green) and $C_{12}E_{10}Ac$ (blue) with different surfactant concentrations. Different degree of ionization (α) scattering profile curves of $C_{12}E_{10}Ac$ with αCD (e) and βCD (f). Curves are scaled by successive factors of 7 for readability. Measurements a and c were recorded on D11 and b and d on D22 at ILL.

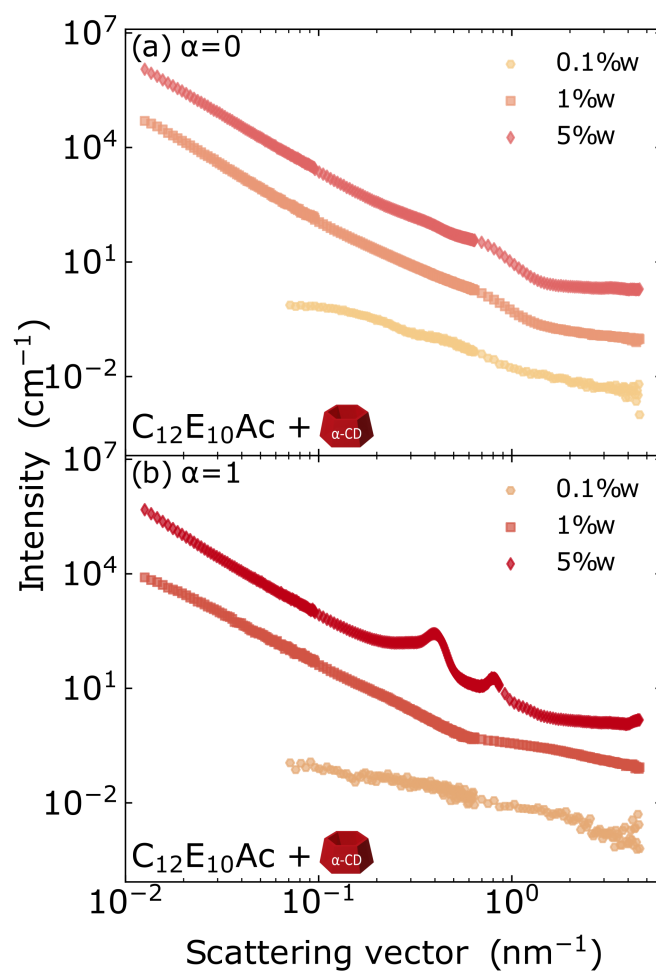


Figure S6: SANS curves of different concentrations of the $\text{C}_{12}\text{E}_{10}\text{Ac}$ - αCD (Ratio $[\text{CD}]/[\text{Surfactant}] = 2$), at (a) $\alpha = 0$ (nonionized) and (b) $\alpha = 1$ (ionized). Curves are scaled by successive factors of 5 for readability. Measurements were recorded on D11 at ILL.

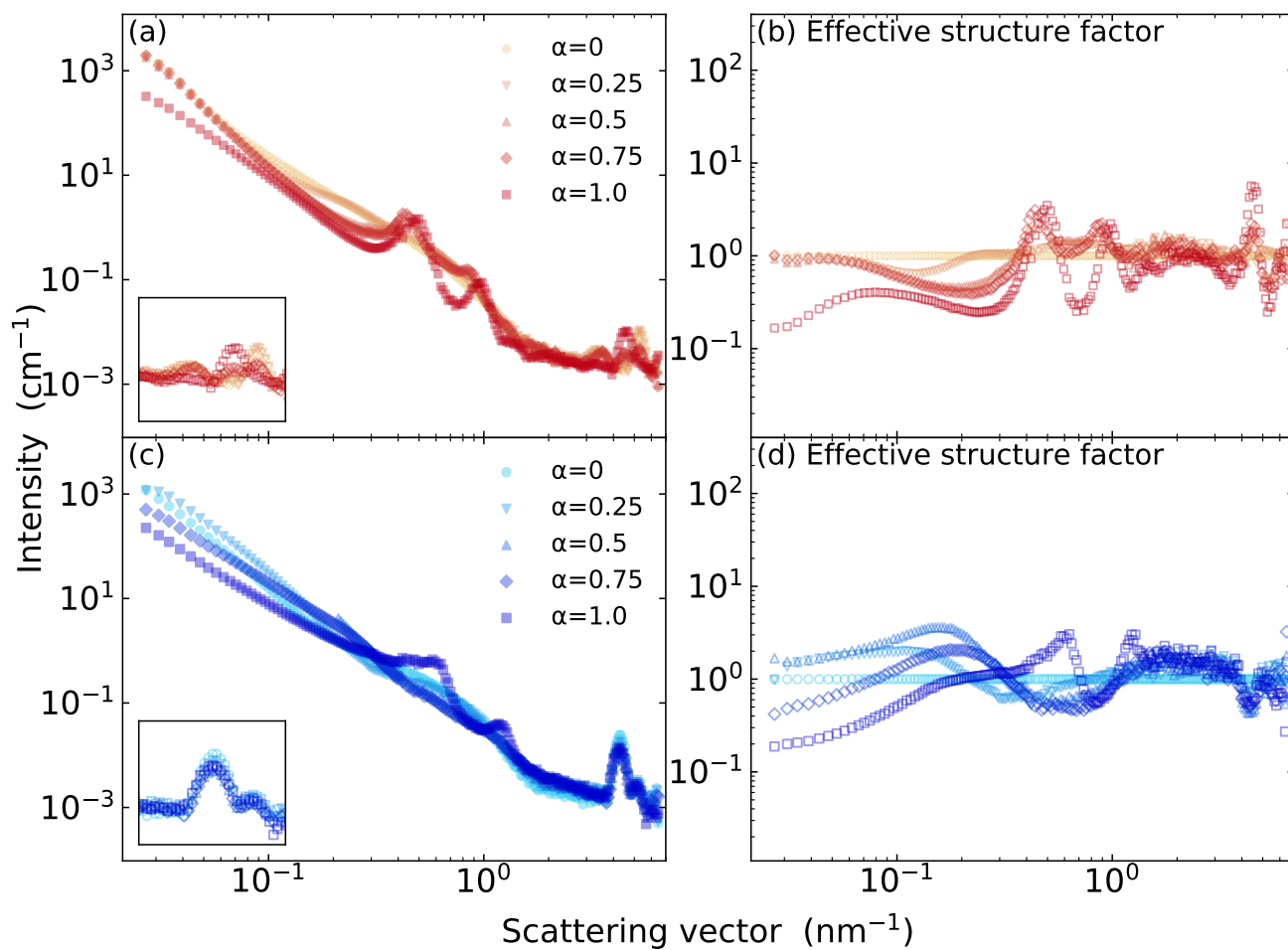


Figure S7: SANS curves: Highlight of the structure factor in the SANS curves of $\text{C}_{12}\text{E}_5\text{Ac}$ at different degree of ionization (Ratio $[\text{CD}]/[\text{Surfactant}] = 2$): (a) α CD and (b) α CD systems: Curves intensity normalized by $\alpha = 0$. (c) β CD and (d) β CD systems: Curves intensity normalized by $\alpha = 0$. Measurements were recorded on D22 at ILL.

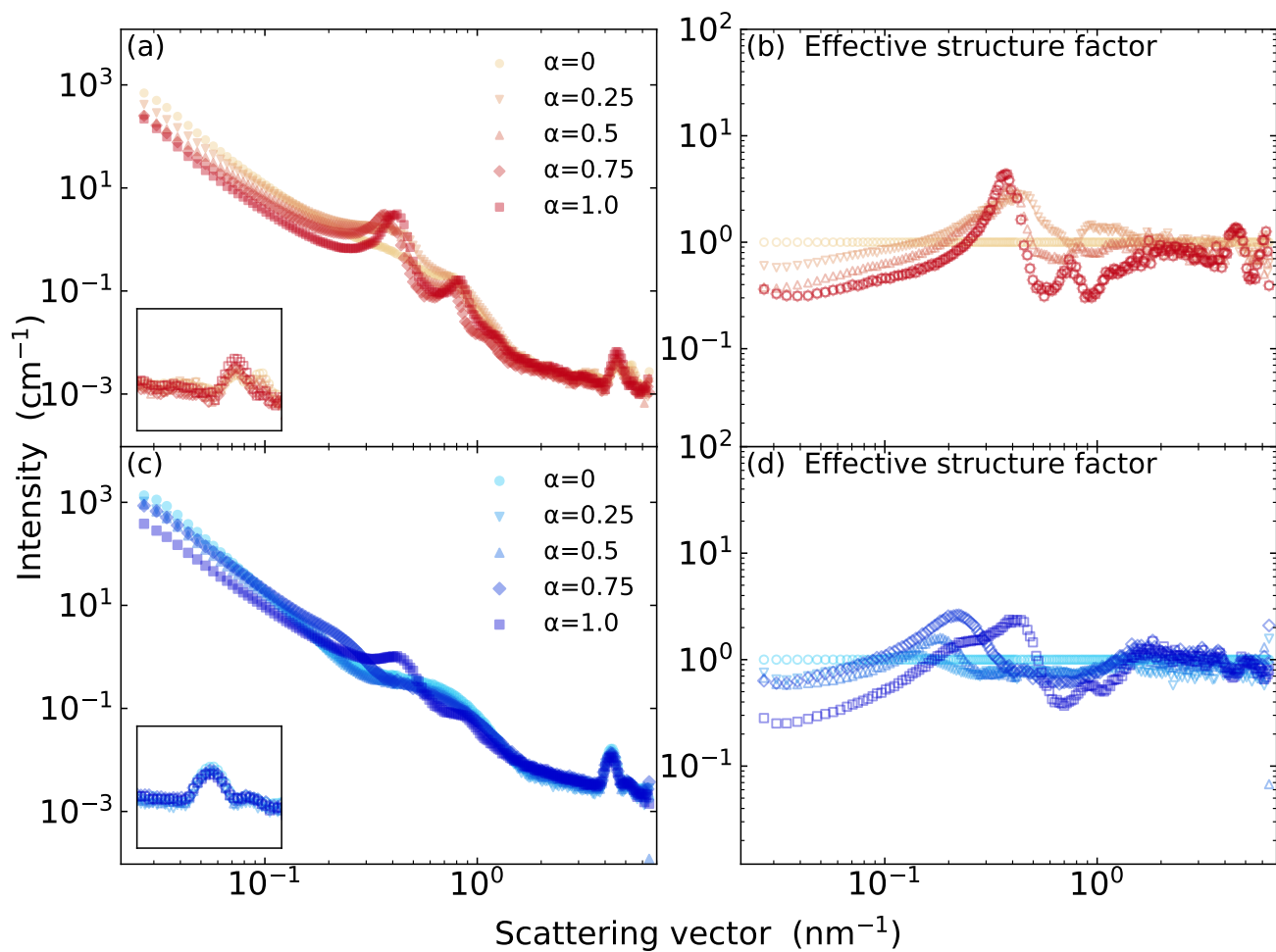


Figure S8: SANS curves: Highlight of the structure factor in the SANS curves of $C_{12}E_{10}Ac$ at different degree of ionization (Ratio $[CD]/[Surfactant] = 2$): (a) αCD and (b) αCD systems: Curves intensity normalized by $\alpha = 0$. (c) βCD and (d) βCD systems: Curves intensity normalized by $\alpha = 0$. Measurements were recorded on D22 at ILL.