Supporting Information

for

Interactions between Hydrophobically Modified Alkali-Swellable Emulsion Polymers and Sodium Dodecyl Sulfate Probed by Fluorescence and Rheology

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Analysis of the fluorescence decays: Upon excitation, the excited pyrene species of Py-HASE in aqueous solution can be classified into four categories, namely Py^{*}_{free}, Py^{*}_{diff}, $E0^*$, and D^*. Py^{*}_{free} represents the excited pyrenes that emit with the natural lifetime τ_M and never form an excimer. This species can be detected in the monomer decay only. Py^{*}_{diff} refers to the excited pyrenes which form excimer via diffusional encounter with a ground-state pyrene. This process is dynamic and is probed in both the monomer and excimer decays. $E0^*$ represents the pyrene excimer that emits with a lifetime τ_E. D^* results from the direct excitation of poorly stacked pre-associated pyrene aggregates that emit with a longer lifetime τ_D. The sum of the concentrations of the two aggregated pyrene species [$E0^*$] and [D^*] yields $[Py^{*}_{agg}]$, the overall concentration of excited pyrenes that are aggregated. The monomer and excimer decays were globally fitted according to the FBM[18,19] with the mathematical expressions of the monomer and excimer given by Equations S1 and S2, respectively.

$$[M^*] = \left[Py^{*}_{diff}\right]_{(t=0)} \exp\left[-\left(A_2 + \frac{1}{\tau_M}\right)t - A_3\left(1 - \exp\left(-A_4 t\right)\right)\right] + \left[Py^{*}_{free}\right]_{(t=0)} \exp\left(-t/\tau_M\right) \tag{S1}$$

$$\begin{aligned}[E^*] = & -[Py^{*}_{diff}]_{(t=0)}\, e^{-A_3} \sum_{i=0}^{\infty} \frac{A_3^{\,i}}{i!} \frac{A_2 + i A_4}{\frac{1}{\tau_M} - \frac{1}{\tau_{E0}} + A_2 + i A_4} \exp\left(-\left(\frac{1}{\tau_M} + A_2 + i A_4\right)t\right) \\ & + \left([E0^*]_{(t=0)} + [Py^{*}_{diff}]_{(t=0)}\, e^{-A_3} \sum_{i=0}^{\infty} \frac{A_3^{\,i}}{i!} \frac{A_2 + i A_4}{\frac{1}{\tau_M} - \frac{1}{\tau_{E0}} + A_2 + i A_4} \right) e^{-t/\tau_{E0}} \\ & + [D^*]_{(t=0)}\, e^{-t/\tau_D} \end{aligned} \tag{S2}$$

The parameters A_2, A_3, and A_4 used in Equations S1 and S2 are given in Equation S3.

$$A_2 = <n> \frac{k_{blob} k_{ex}[blob]}{k_{blob} + k_{ex}[blob]} \quad A_3 = <n> \frac{k_{blob}^2}{(k_{blob} + k_{ex}[blob])^2}$$

$$A_4 = k_{blob} + k_{ex}[blob] \tag{S3}$$

The parameters k_{blob}, $<n>$, and $k_{ex}[blob]$ used in Equation 3 represent the rate constant of pyrene excimer formation inside a blob, the average number of pyrenes per blob, and the product of k_{ex} which is the rate constant describing the exchange of ground-state pyrenes between blobs and [*blob*] which is the local blob concentration, respectively.

The monomer and excimer decays can also be fitted globally according to the MF analysis.[16,17,20] The mathematical expressions used to fit the monomer and excimer fluorescence decays are given by Equations S4 and S5, respectively.

$$[Py^*]_{(t)} = [Py_{diff}^*]_{(t=0)} \times \sum_{i=1}^{n} a_i \times \exp(-t/\tau_i) + [Py_{free}^*]_{(t=0)} \times \exp(-t/\tau_M) \tag{S4}$$

$$[E^*]_{(t)} = -[Py_{diff}^*]_{(t=0)} \times \sum_{i=1}^{n} a_i \frac{\frac{1}{\tau_i} - \frac{1}{\tau_M}}{\frac{1}{\tau_i} - \frac{1}{\tau_{E0}}} \exp(-t/\tau_i)$$

$$+\left([E0*]_{(t=0)}+[Py_{diff}^{*}]_{(t=0)}\times\sum_{i=1}^{n}a_i\frac{\frac{1}{\tau_i}-\frac{1}{\tau_M}}{\frac{1}{\tau_i}-\frac{1}{\tau_{E0}}}\right)\times\exp(-t/\tau_{E0})+[D*]_{(t=0)}\times\exp(-t.\tau_D)$$

(S5)

Global analysis of the monomer and excimer decays using Equations S1 and S2 or S4 and S5 allows the determination of the fractions f_{Mdiff}, f_{Mfree}, f_{Ediff}, f_{EE0}, and f_{ED} whose expressions are given in Equations S6 – S10.

$$f_{Mdiff}=\frac{[Py_{diff}^{*}]_{(t=0)}}{[Py_{diff}^{*}]_{(t=0)}+[Py_{free}^{*}]_{(t=0)}} \quad \text{(S6)}$$

$$f_{Mfree}=\frac{[Py_{free}^{*}]_{(t=0)}}{[Py_{diff}^{*}]_{(t=0)}+[Py_{free}^{*}]_{(t=0)}} \quad \text{(S7)}$$

$$f_{Ediff}=\frac{[Py_{diff}^{*}]_{(t=0)}}{[Py_{diff}^{*}]_{(t=0)}+[E0*]_{(t=0)}+[D*]_{(t=0)}} \quad \text{(S8)}$$

$$f_{EE0}=\frac{[E0*]_{(t=0)}}{[Py_{diff}^{*}]_{(t=0)}+[E0*]_{(t=0)}+[D*]_{(t=0)}} \quad \text{(S9)}$$

$$f_{ED}=\frac{[D*]_{(t=0)}}{[Py_{diff}^{*}]_{(t=0)}+[E0*]_{(t=0)}+[D*]_{(t=0)}} \quad \text{(S10)}$$

The fractions obtained from Equations S6 – S10 can be used to calculate the overall contributions of aggregated pyrene, f_{agg}, diffusional pyrene, f_{diff}, and isolated pyrene, f_{free} in an aqueous Py-HASE12 solution according to Equations S11 – S15.

$$f_{diff}=\frac{[Py_{diff}^{*}]_{(t=0)}}{[Py_{diff}^{*}]_{(t=0)}+[Py_{free}^{*}]_{(t=0)}+[E0*]_{(t=0)}+[D*]_{(t=0)}}=\left(1+\frac{f_{Mfree}}{f_{Mdiff}}+\frac{f_{EE0}}{f_{Ediff}}+\frac{f_{ED}}{f_{Ediff}}\right)^{-1}$$

(S11)

$$f_{free} = \frac{[Py^*_{free}]_{(t=0)}}{[Py^*_{diff}]_{(t=0)} + [Py^*_{free}]_{(t=0)} + [E0^*]_{(t=0)} + [D^*]_{(t=0)}} = f_{diff} \times \frac{f_{Mfree}}{f_{Mdiff}} \tag{S12}$$

$$f_{E0} = \frac{[E0^*]_{(t=0)}}{[Py^*_{diff}]_{(t=0)} + [Py^*_{free}]_{(t=0)} + [E0^*]_{(t=0)} + [D^*]_{(t=0)}} = f_{diff} \times \frac{f_{EE0}}{f_{Ediff}} \tag{S13}$$

$$f_{D} = \frac{[D^*]_{(t=0)}}{[Py^*_{diff}]_{(t=0)} + [Py^*_{free}]_{(t=0)} + [E0^*]_{(t=0)} + [D^*]_{(t=0)}} = f_{diff} \times \frac{f_{ED}}{f_{Ediff}} \tag{S14}$$

$$f_{agg} = f_{E0} + f_{D} \tag{S15}$$

The natural lifetime of pyrene, τ_M, in aqueous solution and in SDS micelles was determined from the long decay time obtained by fitting the monomer fluorescence decays of Py-HASE12 at extremely low pyrene concentration ([Py] = 2.5×10^{-6} mol/L) without and with 0.1 M SDS and was found to equal 164 and 166 ns, respectively. Therefore, τ_M was fixed in all analysis by taking the average value of 165 ns. The analysis was carried out with the Marquardt-Levenberg algorithm[1] to obtain the optimized pre-exponential factors and decay times. The fits were considered good if χ^2 was smaller than 1.30, and residuals and autocorrelation of the residuals were randomly distributed around zero.

Error analysis of the parameters retrieved from the FBM analysis of the decays was carried out by simulating 20 monomer and 20 excimer fluorescence decays (40 decays in total) with different noise patterns for each set of parameters retrieved. The 20 monomer and excimer simulated decays were then analyzed according to the

FBM. The parameters that were obtained from these 20 fits were averaged and their standard deviation was determined. In the very large majority of parameters, the error bars represented less than 10% of the average value (see Tables S1B, S1B, S2A and S2B in Supporting Information).

Reference

1. Press, W. H.; Flannery, B. P.; Teukolsky, S. A.; Vetterling, W. T. *Numerical Recipes. The Art of Scientific Computing (Fortran Version)*; Cambridge University Press: Cambridge, 1992.

Table S1A: Parameters retrieved from the global MF analysis of the pyrene monomer and excimer fluorescence decays acquired with an 8 g/L Py-HASE12 in 0.01 M Na_2CO_3, pH 9 solution.

[SDS]	Monomer						Excimer							χ^2
mM	τ_1 ns	a_1	τ_2 ns	a_2	τ_M ns	f_{Mfree}	f_{Ediff}	τ_{E0} ns	f_{EE0}	τ_{ED} ns	f_{ED}	τ_{ES} ns	f_{ES}	
50.0	35.4	0.16	99.0	0.23	165	0.61	0.54	61	0.09	-	-	3.5	0.36	1.14
20.0	35.3	0.19	95.6	0.25	165	0.56	0.60	57	0.10	-	-	3.5	0.29	1.11
10.0	31.2	0.23	87.8	0.24	165	0.54	0.63	56	0.12	-	-	3.5	0.24	1.11
7.6	33.1	0.24	84.4	0.30	165	0.46	0.70	55	0.12	-	-	3.5	0.17	1.14
5.1	32.7	0.29	80.6	0.31	165	0.40	0.82	53	0.16	92	0.01	-	-	1.15
3.5	29.0	0.30	70.2	0.28	165	0.42	0.79	52	0.20	150	0.01	-	-	1.04
2.5	22.7	0.24	56.6	0.29	165	0.47	0.77	48	0.17	107	0.05	-	-	1.04
2.0	22.2	0.25	58.9	0.17	165	0.58	0.67	47	0.30	114	0.02	-	-	1.15
1.6	17.1	0.18	73.8	0.11	165	0.71	0.47	45	0.49	155	0.03	-	-	1.12
1.2	15.1	0.10	45.0	0.18	165	0.72	0.57	41	0.38	127	0.05	-	-	1.14
0.8	18.6	0.18	86.7	0.11	165	0.70	0.48	46	0.49	162	0.02	-	-	1.06
0.6	18.8	0.12	70.7	0.12	165	0.76	0.28	47	0.64	141	0.08	-	-	1.07
0.4	14.7	0.10	71.7	0.14	165	0.75	0.24	49	0.64	143	0.12	-	-	1.13
0.2	15.9	0.10	84.0	0.17	165	0.73	0.23	50	0.66	145	0.10	-	-	1.09
0.1	16.3	0.11	85.4	0.16	165	0.73	0.24	49	0.65	143	0.11	-	-	0.96

Table S1B: Parameters retrieved from the global FBM analysis of the pyrene monomer and excimer fluorescence decays acquired with an 8 g/L Py-HASE12 in 0.01 M Na_2CO_3, pH 9 solution.

[SDS]	Monomer						Excimer							χ^2
mM	k_{ex} $\times 10^7$ s^{-1}	f_{Mdiff}	k_{blob} $\times 10^7$ s^{-1}	$<n>$	τ_M ns	f_{Mfree}	f_{Ediff}	τ_{E0} ns	f_{EE0}	τ_{ED} ns	f_{ED}	τ_{ES} ns	f_{ES}	
50.0	0.55 (±0.03)	0.39 (±0.00)	1.1 (±0.0)	1.16 (±0.01)	165	0.61 (±0.00)	0.53 (±0.01)	61 (±1)	0.08 (±0.00)	-	-	3.5	0.39 (±0.01)	1.15
20.0	0.64 (±0.03)	0.44 (±0.00)	1.0 (±0.0)	1.23 (±0.02)	165	0.56 (±0.00)	0.62 (±0.01)	56 (±1)	0.09 (±0.00)	-	-	3.5	0.29 (±0.01)	1.14
10.0	0.46 (±0.02)	0.47 (±0.00)	1.1 (±0.0)	1.55 (±0.01)	165	0.53 (±0.00)	0.63 (±0.00)	57 (±1)	0.11 (±0.00)	-	-	3.5	0.26 (±0.00)	1.10
7.6	0.54 (±0.02)	0.55 (±0.00)	0.9 (±0.0)	1.64 (±0.02)	165	0.45 (±0.00)	0.70 (±0.00)	54 (±1)	0.11 (±0.00)	-	-	3.5	0.18 (±0.00)	1.11
5.1	0.49 (±0.04)	0.60 (±0.00)	0.8 (±0.0)	2.03 (±0.04)	165	0.40 (±0.00)	0.83 (±0.01)	52 (±1)	0.12 (±0.03)	88 (±45)	0.04 (±0.02)	-	-	1.15
3.5	0.53 (±0.04)	0.58 (±0.00)	0.8 (±0.0)	2.39 (±0.06)	165	0.42 (±0.00)	0.80 (±0.00)	51 (±1)	0.19 (±0.01)	158 (±33)	0.01 (±0.00)	-	-	1.05
2.5	0.89 (±0.17)	0.52 (±0.00)	1.0 (±0.1)	2.4 (±0.1)	165	0.47 (±0.00)	0.78 (±0.01)	48 (±1)	0.15 (±0.1)	103 (±4)	0.06 (±0.01)	-	-	1.04
2.0	0.46 (±0.07)	0.42 (±0.00)	1.0 (±0.0)	2.7 (±0.1)	165	0.57 (±0.01)	0.67 (±0.01)	47 (±1)	0.29 (±0.01)	105 (±12)	0.03 (±0.01)	-	-	1.15
1.6	0.53 (±0.04)	0.29 (±0.00)	2.6 (±0.1)	1.59 (±0.06)	165	0.71 (±0.00)	0.49 (±0.01)	45 (±1)	0.47 (±0.01)	151 (±5)	0.03 (±0.00)	-	-	1.12
1.2	1.4 (±0.4)	0.29 (±0.05)	1.8 (±0.1)	1.9 (±0.3)	165	0.71 (±0.06)	0.57 (±0.02)	43 (±2)	0.39 (±0.04)	131 (±14)	0.04 (±0.01)	-	-	1.13
0.8	0.40 (±0.04)	0.30 (±0.00)	2.4 (±0.1)	1.43 (±0.06)	165	0.70 (±0.01)	0.51 (±0.01)	45 (±1)	0.46 (±0.01)	155 (±11)	0.02 (±0.00)	-	-	1.06
0.6	0.86 (±0.04)	0.25 (±0.01)	2.7 (±0.4)	1.3 (±0.1)	165	0.75 (±0.03)	0.28 (±0.04)	48 (±2)	0.64 (±0.05)	142 (±7)	0.08 (±0.01)	-	-	1.06
0.4	1.2 (±0.2)	0.26 (±0.02)	4.2 (±0.7)	0.89 (±0.09)	165	0.74 (±0.00)	0.24 (±0.03)	49 (±2)	0.64 (±0.03)	144 (±4)	0.12 (±0.01)	-	-	1.13
0.2	0.9 (±0.1)	0.28 (±0.00)	3.8 (±0.6)	0.81 (±0.04)	165	0.72 (±0.01)	0.25 (±0.03)	50 (±2)	0.64 (±0.03)	143 (±5)	0.11 (±0.01)	-	-	0.96
0.1	1.0 (±0.1)	0.28 (±0.00)	4.4 (±0.6)	0.75 (±0.04)	165	0.72 (±0.00)	0.23 (±0.02)	51 (±1)	0.66 (±0.02)	146 (±4)	0.10 (±0.01)	-	-	1.09

Table S1C: Parameters retrieved from the global MF analysis of the pyrene monomer and excimer fluorescence decays acquired with a 57 g/L Py-HASE12 in 0.01 M Na_2CO_3, pH 9 solution.

[SDS] mM	Monomer						Excimer								χ^2
	τ_1 ns	a_1	τ_2 ns	a_2	τ_M ns	f_{Mfree}	f_{Ediff}	τ_{E0} ns	f_{EE0}	τ_{ED} ns	f_{ED}	τ_{ES} ns	f_{ES}		
50.0	35.2	0.14	93.7	0.23	165	0.62	0.55	60	0.08	-	-	3.5	0.36		1.16
25.0	35.1	0.13	87.0	0.29	165	0.59	0.63	54	0.08	-	-	3.5	0.29		1.09
20.0	35.3	0.24	93.6	0.22	165	0.54	0.59	54	0.10	-	-	3.5	0.32		1.04
15.0	32.4	0.24	84.8	0.31	165	0.45	0.70	56	0.12	-	-	3.5	0.18		1.19
11.1	29.5	0.36	82.5	0.24	165	0.40	0.80	55	0.13	-	-	3.5	0.07		1.09
10.0	25.5	0.33	72.7	0.21	165	0.45	0.72	48	0.20	-	-	3.5	0.07		1.11
8.5	22.3	0.26	59.9	0.16	165	0.55	0.67	48	0.31	117	0.03	-	-		1.15
5.0	22.0	0.13	85.4	0.12	165	0.75	0.41	43	0.55	139	0.05	-	-		1.10
3.5	18.4	0.13	82.1	0.13	165	0.74	0.39	44	0.56	145	0.05	-	-		1.08
2.0	19.2	0.13	75.0	0.12	165	0.74	0.40	43	0.55	145	0.05	-	-		0.98
1.0	25.8	0.11	88.1	0.14	165	0.75	0.25	49	0.60	135	0.15	-	-		1.10
0.8	25.3	0.12	95.9	0.16	165	0.72	0.24	48	0.61	135	0.15	-	-		1.18
0.5	34.9	0.13	113.6	0.17	165	0.70	0.22	48	0.64	135	0.14	-	-		1.03
0.3	16.5	0.11	91.9	0.19	165	0.70	0.20	50	0.67	141	0.13	-	-		1.04
0.1	15.4	0.11	90.2	0.19	165	0.70	0.15	51	0.71	141	0.14	-	-		1.01

Table S1D: Parameters retrieved from the global FBM analysis of the pyrene monomer and excimer fluorescence decays acquired with a 57 g/L Py-HASE12 in 0.01 M Na_2CO_3, pH 9 solution.

[SDS]	Monomer						Excimer							χ^2
mM	k_{ex} $\times 10^7$ s^{-1}	f_{Mdiff}	k_{blob} $\times 10^7$ s^{-1}	$\langle n \rangle$	τ_M ns	f_{Mfree}	f_{Ediff}	τ_{E0} ns	f_{EE0}	τ_{ED} ns	f_{ED}	τ_{ES} ns	f_{ES}	
50.0	0.84 (±0.02)	0.38 (±0.00)	0.9 (±0.1)	1.00 (±0.04)	165	0.62 (±0.00)	0.55 (±0.01)	59 (±1)	0.07 (±0.00)	-	-	3.5	0.38 (±0.01)	1.21
25.0	0.85 (±0.02)	0.42 (±0.00)	0.9 (±0.0)	1.30 (±0.04)	165	0.58 (±0.00)	0.63 (±0.01)	54 (±1)	0.08 (±0.00)	-	-	3.5	0.29 (±0.01)	1.10
20.0	0.32 (±0.01)	0.47 (±0.00)	0.9 (±0.0)	1.49 (±0.02)	165	0.53 (±0.00)	0.59 (±0.01)	54 (±1)	0.09 (±0.00)	-	-	3.5	0.32 (±0.00)	1.04
15.0	0.57 (±0.03)	0.55 (±0.00)	0.9 (±0.0)	1.70 (±0.02)	165	0.45 (±0.00)	0.69 (±0.00)	56 (±1)	0.11 (±0.00)	-	-	3.5	0.20 (±0.00)	1.19
11.1	0.33 (±0.02)	0.61 (±0.00)	1.0 (±0.1)	2.00 (±0.01)	165	0.40 (±0.01)	0.81 (±0.01)	55 (±0)	0.13 (±0.00)	-	-	3.5	0.07 (±0.00)	1.06
10.0	0.44 (±0.02)	0.55 (±0.00)	1.1 (±0.0)	2.20 (±0.02)	165	0.45 (±0.00)	0.72 (±0.00)	48 (±0)	0.18 (±0.00)	-	-	3.5	0.10 (±0.00)	1.10
8.5	0.44 (±0.07)	0.42 (±0.00)	1.1 (±0.0)	2.7 (±0.1)	165	0.57 (±0.01)	0.67 (±0.00)	48 (±1)	0.29 (±0.01)	107 (±12)	0.03 (±0.01)	-	-	1.15
5.0	0.50 (±0.05)	0.25 (±0.00)	1.9 (±0.1)	1.28 (±0.08)	165	0.75 (±0.00)	0.42 (±0.02)	43 (±1)	0.53 (±0.02)	136 (±5)	0.05 (±0.01)	-	-	1.11
3.5	0.61 (±0.05)	0.26 (±0.00)	2.6 (±0.2)	1.17 (±0.06)	165	0.74 (±0.00)	0.40 (±0.01)	45 (±1)	0.55 (±0.01)	142 (±4)	0.05 (±0.00)	-	-	1.08
2.0	0.66 (±0.05)	0.26 (±0.00)	2.3 (±0.2)	1.34 (±0.07)	165	0.74 (±0.00)	0.41 (±0.01)	44 (±1)	0.54 (±0.01)	143 (±4)	0.05 (±0.00)	-	-	0.99
1.0	0.3 (±0.2)	0.25 (±0.01)	0.9 (±0.1)	1.5 (±0.2)	165	0.75 (±0.01)	0.26 (±0.06)	45 (±3)	0.60 (±0.05)	133 (±2)	0.14 (±0.01)	-	-	1.11
0.8	0.39 (±0.12)	0.28 (±0.01)	1.4 (±0.3)	1.08 (±0.01)	165	0.72 (±0.01)	0.24 (±0.04)	46 (±2)	0.61 (±0.04)	133 (±2)	0.15 (±0.01)	-	-	1.18
0.5	0.28 (±0.12)	0.32 (±0.02)	1.2 (±0.2)	0.96 (±0.08)	165	0.68 (±0.02)	0.23 (±0.06)	48 (±2)	0.63 (±0.05)	135 (±2)	0.14 (±0.01)	-	-	1.03
0.3	0.85 (±0.06)	0.31 (±0.00)	4.3 (±0.4)	0.79 (±0.03)	165	0.70 (±0.01)	0.19 (±0.02)	50 (±1)	0.67 (±0.02)	141 (±2)	0.14 (±0.01)	-	-	1.04
0.1	0.90 (±0.07)	0.30 (±0.00)	4.0 (±0.5)	0.70 (±0.03)	165	0.70 (±0.00)	0.15 (±0.02)	51 (±1)	0.71 (±0.02)	143 (±2)	0.14 (±0.01)	-	-	1.01

Table S2A: Fractions of all pyrene species determined by the global analysis of the decays acquired with an 8 g/L Py-HASE12 in 0.01 M Na_2CO_3, pH 9 solution.

[SDS] mM	MF					FBM				
	f_{diff}	f_{free}	f_{E0}	f_D	f_{agg}	f_{diff}	f_{free}	f_{E0}	f_D	f_{agg}
50.0	0.36	0.57	0.06	-	0.06	0.37 (±0.00)	0.58 (±0.00)	0.06 (±0.00)	-	0.06 (±0.00)
20.0	0.41	0.52	0.07	-	0.07	0.41 (±0.00)	0.53 (±0.00)	0.06 (±0.00)	-	0.06 (±0.00)
10.0	0.42	0.49	0.08	-	0.08	0.43 (±0.00)	0.49 (±0.00)	0.08 (±0.00)	-	0.08 (±0.00)
7.6	0.50	0.42	0.09	-	0.09	0.50 (±0.00)	0.42 (±0.01)	0.08 (±0.00)	-	0.08 (±0.01)
5.1	0.53	0.35	0.10	0.01	0.11	0.53 (±0.01)	0.36 (±0.00)	0.08 (±0.02)	0.03 (±0.01)	0.11 (±0.02)
3.5	0.50	0.36	0.13	0.00	0.13	0.50 (±0.00)	0.37 (±0.00)	0.12 (±0.00)	0.01 (±0.00)	0.13 (±0.00)
2.5	0.45	0.41	0.10	0.03	0.13	0.46 (±0.00)	0.41 (±0.01)	0.09 (±0.01)	0.03 (±0.01)	0.13 (±0.01)
2.0	0.35	0.48	0.16	0.01	0.17	0.35 (±0.00)	0.48 (±0.00)	0.15 (±0.01)	0.02 (±0.01)	0.17 (±0.01)
1.6	0.22	0.54	0.23	0.01	0.24	0.22 (±0.00)	0.55 (±0.01)	0.21 (±0.01)	0.01 (±0.00)	0.23 (±0.01)
1.2	0.23	0.59	0.15	0.02	0.17	0.24 (±0.04)	0.58 (±0.06)	0.16 (±0.01)	0.02 (±0.01)	0.18 (±0.01)
0.8	0.23	0.53	0.23	0.01	0.24	0.23 (±0.00)	0.54 (±0.01)	0.21 (±0.01)	0.01 (±0.00)	0.23 (±0.01)
0.6	0.15	0.47	0.34	0.04	0.38	0.15 (±0.02)	0.46 (±0.02)	0.35 (±0.03)	0.04 (±0.01)	0.39 (±0.02)
0.4	0.14	0.42	0.37	0.07	0.44	0.14 (±0.01)	0.41 (±0.03)	0.37 (±0.03)	0.07 (±0.01)	0.44 (±0.02)
0.2	0.14	0.38	0.41	0.07	0.47	0.15 (±0.01)	0.39 (±0.02)	0.39 (±0.03)	0.07 (±0.01)	0.46 (±0.02)
0.1	0.15	0.39	0.39	0.07	0.46	0.14 (±0.01)	0.38 (±0.03)	0.41 (±0.02)	0.07 (±0.01)	0.48 (±0.02)

Table S2B: Fractions of all pyrene species determined by the global analysis of the decays acquired with a 57 g/L Py-HASE12 in 0.01 M Na_2CO_3, pH 9 solution.

[SDS] mM	MF					FBM				
	f_{diff}	f_{free}	f_{E0}	f_D	f_{agg}	f_{diff}	f_{free}	f_{E0}	f_D	f_{agg}
50.0	0.36	0.59	0.05	-	0.05	0.36 (±0.00)	0.59 (±0.00)	0.04 (±0.01)	-	0.04 (±0.01)
25.0	0.39	0.56	0.05	-	0.05	0.39 (±0.01)	0.56 (±0.01)	0.05 (±0.00)	-	0.05 (±0.00)
20.0	0.43	0.50	0.07	-	0.07	0.44 (±0.00)	0.49 (±0.00)	0.07 (±0.00)	-	0.07 (±0.00)
15.0	0.50	0.41	0.08	-	0.08	0.51 (±0.00)	0.41 (±0.00)	0.08 (±0.0)	-	0.08 (±0.00)
11.1	0.54	0.37	0.09	-	0.09	0.55 (±0.00)	0.36 (±0.00)	0.09 (±0.00)	-	0.09 (±0.00)
10.0	0.47	0.39	0.13	-	0.13	0.49 (±0.00)	0.39 (±0.00)	0.12 (±0.00)	-	0.12 (±0.00)
8.5	0.37	0.45	0.17	0.01	0.18	0.35 (±0.00)	0.48 (±0.00)	0.15 (±0.01)	0.02 (±0.01)	0.17 (±0.01)
5.0	0.18	0.55	0.24	0.02	0.27	0.19 (±0.01)	0.56 (±0.01)	0.23 (±0.02)	0.02 (±0.00)	0.26 (±0.01)
3.5	0.18	0.53	0.26	0.02	0.29	0.19 (±0.00)	0.53 (±0.01)	0.26 (±0.01)	0.02 (±0.00)	0.28 (±0.01)
2.0	0.19	0.54	0.25	0.02	0.27	0.19 (±0.00)	0.53 (±0.01)	0.26 (±0.01)	0.02 (±0.00)	0.28 (±0.01)
1.0	0.14	0.43	0.34	0.08	0.42	0.15 (±0.02)	0.43 (±0.07)	0.34 (±0.07)	0.08 (±0.02)	0.42 (±0.05)
0.8	0.15	0.38	0.38	0.09	0.47	0.15 (±0.02)	0.38 (±0.04)	0.38 (±0.05)	0.09 (±0.01)	0.47 (±0.03)
0.5	0.14	0.33	0.43	0.10	0.52	0.15 (±0.03)	0.33 (±0.06)	0.42 (±0.07)	0.09 (±0.01)	0.51 (±0.05)
0.3	0.13	0.32	0.46	0.09	0.55	0.13 (±0.01)	0.30 (±0.02)	0.47 (±0.03)	0.10 (±0.01)	0.56 (±0.02)
0.1	0.11	0.26	0.53	0.10	0.63	0.11 (±0.01)	0.26 (±0.03)	0.53 (±0.04)	0.10 (±0.01)	0.63 (±0.03)