Monitoring Non-Specific Adsorption at Solid-Liquid Interfaces by Supercritical Angle Fluorescence Microscopy

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Supplementary Material

APPENDIX: THICKNESS OF TEFLON-AF COATING AND CALCULATION OF BSA ADSORPTION KINETICS

Table S1. Spin coating condition and thickness of Teflon® AF layer on cover glass

Concentration of Teflon® AF (% w/w)	Solvent	Spin speed (rpm)	Average thickness ±1SD* (nm)
0.5	FC-40	3000	7.66±0.48
1	FC-40	1000	26.5±0.16
1	PFC110	2000	44.0±1.43
1	PFC110	1000	53.1±5.5
1.95	FC-40	3000	112.5±1.5
1.95	FC-40	1000	315±39

*Thickness determined by AFM

Calculation of adsorption rate constant (k_a) and half-life ($t_{1/2}$)

The integral pseudo-first-order equation is expressed as follows[15],

$$\ln(q_e - q_t) = \ln(q_e) - k_a t \quad (1)$$

where q_e and q_t are the quantity of BSA (mg/g) adsorbed on a surface at equilibrium and at any time t, respectively, and k_a is the rate constant of the pseudo-first-order-adsorption (s^{-1}).

The supercritical intensity is proportional to the quantity of AF-488 BSA adsorption on the surface, and we substitute q_e and q_t by the supercritical intensities at equilibrium and at time t (I_e and I_t) to give linearized equation (2).

$$\ln(I_q - I_t) = \ln(I_q) - k_a t \quad (2)$$

The equilibrium intensity is determined from data like that in Figure 6, where the supercritical intensity of BSA first reached plateau at ~20s. I_q was then determined as the average supercritical intensity between 20-21 s. The supercritical intensity between 2.4s and 20s was computed to determine the value of $\ln(I_q - I_t)$, which was plotted as a function of adsorption time (time elapsed after addition of BSA solution) in Figure S1.

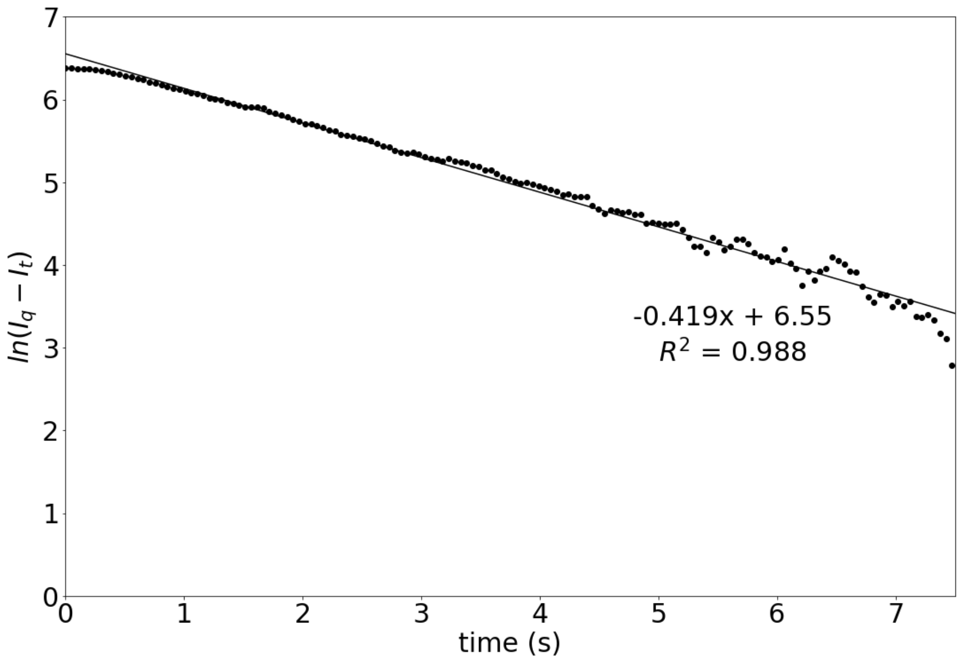

Figure S1. Integrated Plot for pseudo-first-order adsorption kinetic for BSA. Plot of ln(I_q-I_t) as a function of adsorption time. The adsorption rate constant (k_a) was determined to be $0.4227 \pm 0.004 s^{-1}$ from the slope of best fit.

By equation (2),

$$k_a = -\text{slope of best fit} = \ 0.419 \pm 0.004\ \text{s}^{-1}$$

The adsorption half-life ($t_{1/2}$) was calculated as,

$$t_{\frac{1}{2}} = \frac{\ln(2)}{k_a} = \frac{\ln(2)}{0.419\ s^{-1}} = 1.65 \pm 0.016\ s$$