SUPPLEMENTARY MATERIALS

Effect of Salt Content on Solubilization of Hydrophobic Polymer by Wormlike Micelles of Ionic Surfactant

Alexander L. Kwiatkowski*, Pavel V. Kalinin, Olga E. Philippova

Physics Department, Lomonosov Moscow State University, Moscow, Russia
*(*Corresponding author's e-mail: kvyatkovskij@physics.msu.ru)*

Details of P4VP Polydispersity (PI) Estimation by Dynamic-Light Scattering (DLS)

As the diffusion coefficient of polymer D is inversely related to its molar mass M_w, the PI of M_w is equal to PI of D. Dynamic-light-scattering experiments were conducted to obtain PI of P4VP diffusion coefficient in ethanol D. Intensity autocorrelation function $g^{(1)}(t)$ of scattering from P4VP was measured with ALV/DLS/SLS-5022F device (ALV GmbH, Langen, Germany), equipped with ALV6010/EPP digital correlator and helium−neon laser (wavelength of 632.8 nm) as a light source, at 20°C. The samples were preliminary filtered through 0.45 μm filter (Millipore Millex-FG).

The intensity autocorrelation function $g^{(1)}(t)$ was treated with method of Cumulants. [1] The dependence of $\ln|g^{(1)}(t)|$ on observation time t in the method represents the polynomial of second order: [1]

$$\ln\left|g^{(1)}(t)\right| = A - \Gamma t + \frac{\mu_2 t^2}{2}, \quad (1)$$

where Γ and μ_2 are mean decay constant and variance, respectively. In this case, PI of the diffusion coefficient D equals to:

$$PI = \frac{\Delta D}{D} = \frac{\mu_2}{\Gamma^2}. \quad (2)$$

Dependence of $\ln|g^{(1)}(t)|$ on observation time t of the 5 wt.% solution of P4VP in ethanol is present in Figure S1. According to Eq.(1), estimated values of Γ and μ_2 were equal to 9.29±0.06 s^{-1} and 5.56±0.07 s^{-2}, respectively. From Eq.(2) the corresponding value of PI of P4VP diffusion coefficient in ethanol D equaled to 0.06. Thus, the estimated value of PI<0.1 points out the narrow distribution of contour length of P4VP [1].

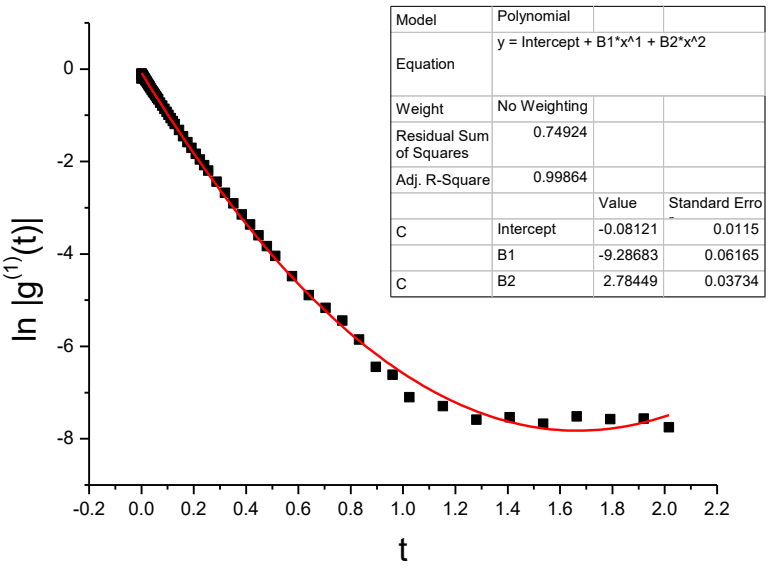

Figure S1. Dependence of $\ln|g^{(1)}(t)|$ vs t of 0.5 wt.% solution of P4VP in ethanol

References

1 Hassan, P. A., Rana, S., & Verma, G. (2015). Making sense of brownian motion: Colloid characterization by dynamic light scattering. *Langmuir*, *31*(1), 3–12. https://doi.org/10.1021/la501789z