Electronic Supplementary Material (ESI) for Soft Matter

Supporting Information

Buckling-Induced Structural Transition in Drying a Polymeric Latex Droplet at Solid Surface

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Brief description of GIFT (Generalized Indirect Fourier Transformation)
For detailed information please see (J. Brunner-Popela and O. Glatter, *J. Appl. Cryst.*, 1997, 30, 431. and G. Fritz, A. Bergmann and O. Glatter, *J. Chem. Phys.*, 2000, 113, 9733.)

In treating scattering data from our dispersion which is charge stabilized colloidal particles, the interaction between particles are considered to have a Hypernetted chain closure (HNC) relation. The scattering intensity reads

$$I \propto P(q)S(q)$$

where P(q) and S(q) are form factor of individual particles and structure factor arising from the interaction between particles, respectively. For spherical particles with a radius of R like we have

$$P(q) \propto \frac{9(\sin(qR) - qR\cos(qR))^2}{(qR)^6}$$ and

$$S(q) = 1 + 4\pi n \int_0^\infty h(r) r^2 \frac{\sin(qr)}{qr} dr$$

Where h(r) is the Ornstein-Zernike equation and reads

$$h(r) = c(r) + n\int dr' c(r - r')h(r')$$

where the total correlation function $h(r)$ is related to the direct correlation function between the particles $c(r)$ and the indirect contributions, which are represented by the integral. r is the center to center distance of the spheres.

HNC closure relation reads: $g(r) = e^{-\beta v(r) + h(r) - c(r)}$ with the pair distribution function $g(r)=h(r)+1$ and

$$\beta v(r) = \frac{Z^2 e_0^2}{4\pi\varepsilon\varepsilon_0 kT} \cdot \frac{e^{-\kappa(r-2R)}}{r(1+\kappa R)^2}$$

where *v (r)* is Yukawa potential, *z* is the number of unit electron charges on the particle, e_0 is the charge of an electron, ε_0 is the permittivity of vacuum, ε the relative dielectric constant, *k* the Boltzmann constant, *T* the temperature, *R* the radius of the spheres, κ the Debye screening parameter, which is determined by the ionic strength (*I*).

$$\kappa = \sqrt{\frac{\varepsilon\varepsilon_0 kT}{2N_A e_0^2 I}}$$ where

$$I = \frac{1}{2}\sum_{i=1}^{n} c_i z_i^2$$ which depends on the concentrations c_i and charges z_i of all *n* different ions present in the solution.

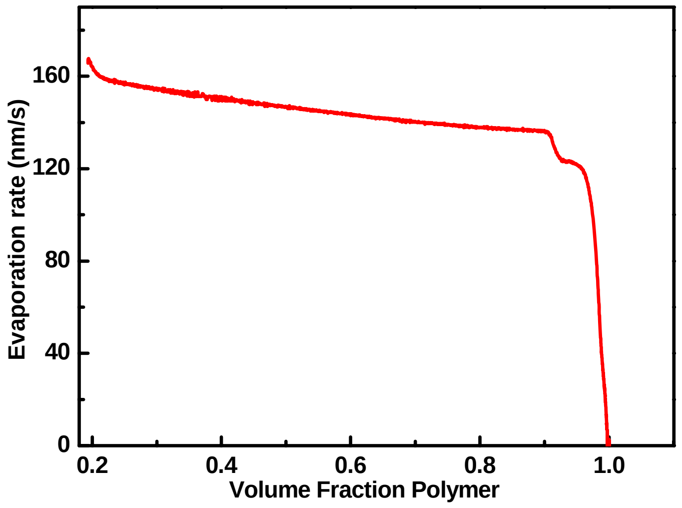

Figure S1. Evaporation rate of water in a latex droplet as a function of the volume fraction polymer.