Supporting Information

A facile method to determine the molar mass of soft nanoparticles

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S1 Number of microgels per focused area

As outlined in the main paper, we recorded series of microscopy images with different z-foci. The number of microgels between 20 µm and 40 µm above the coverslip surface was counted for each focus and histogrammed as shown below in Fig. S1. The distribution were fitted with a Poisson function.

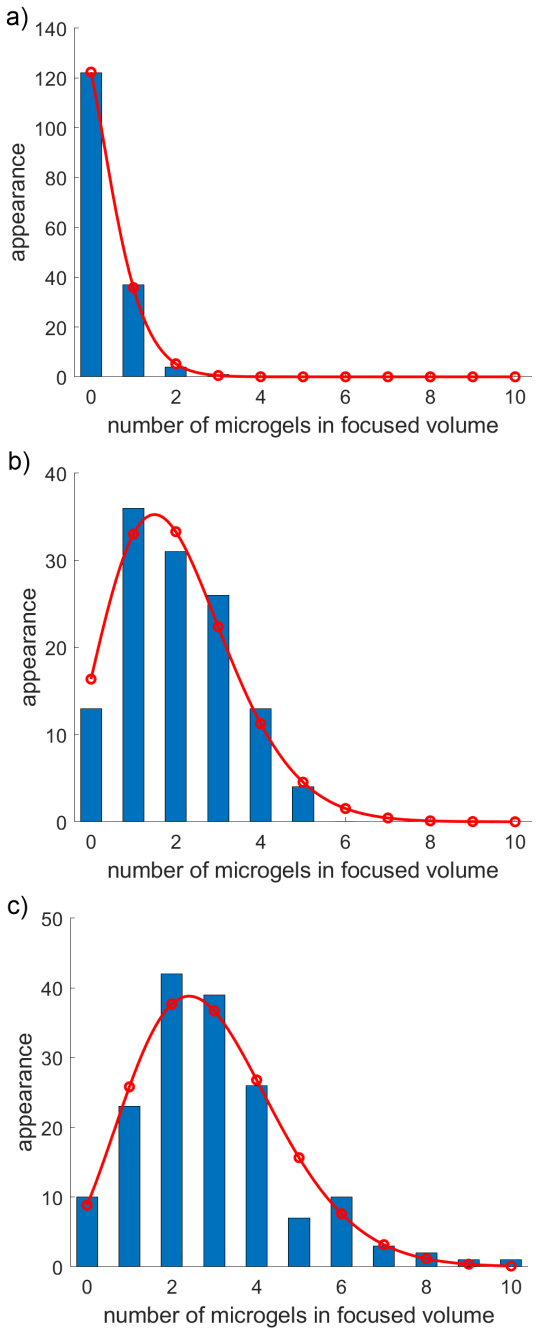

Fig. S1 Distributions of the number of microgels found in different foci between 20 µm and 40 µm for mass concentrations γ of (a) 0.5 mg L^{-1}, (b) 2.5 mg L^{-1}, and (c) 5.0 mg L^{-1}.

S2 Effect of Filtering in Static Light Scattering

Filtering of the microgel dispersions was found to strongly affect the scattered intensity (see Fig. S2). Before filtering (see Fig. S2b) the microgel dispersions produce steadily increasing intensities towards low q. A plateau of the scattered intensity towards low q (Guinier regime), which is needed to obtain the microgel molar mass, is not observed. After filtering the microgel dispersion through a filter with a pore size of 1.2 µm, the scattering curves level off at low q and show a Guinier regime on the left hand side of the dashed line (see Fig. S2a). However, the scattering intensities are strongly decreased at all concentrations (even by a factor of 10 for $0.04\,\mathrm{g\,L^{-1}}$), which corresponds to a significant decrease in microgel concentration and prevents, for this system, reliable determination of the molar mass via SLS.

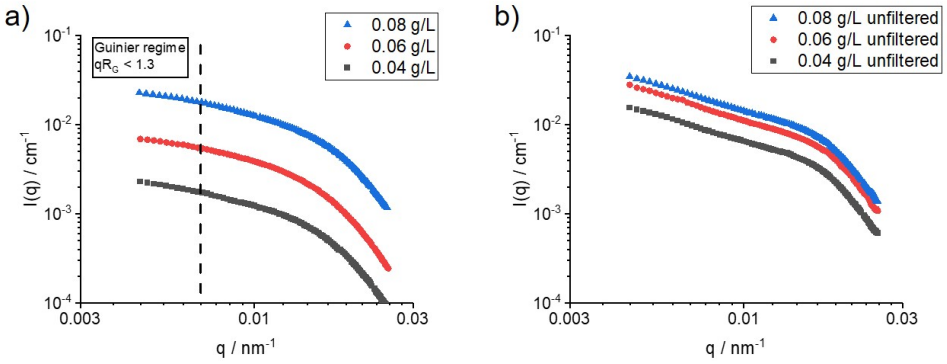

Fig. S2 Scattered intensities of $0.04\,\mathrm{g\,L^{-1}}$, $0.06\,\mathrm{g\,L^{-1}}$ and $0.08\,\mathrm{g\,L^{-1}}$ (a) after and (b) before filtering. The Guinier regime in a) is calculated using $R_G = 189\,\mathrm{nm}$ obtained from the Zimm-Guinier analysis in the main paper.

S3 Dynamic Light Scattering Analysis

The cumulant fits of the linearized field auto-correlation functions gave good fits to our data as shown in Fig. S3a. The decay rates Γ showed linear behavior in q^2 (see Fig. S3b) yielding the diffusion coefficient $D_0 = (8.61 \pm 0.05) \times 10^{-13}\,\mathrm{m^2\,s^{-1}}$ as the slope.

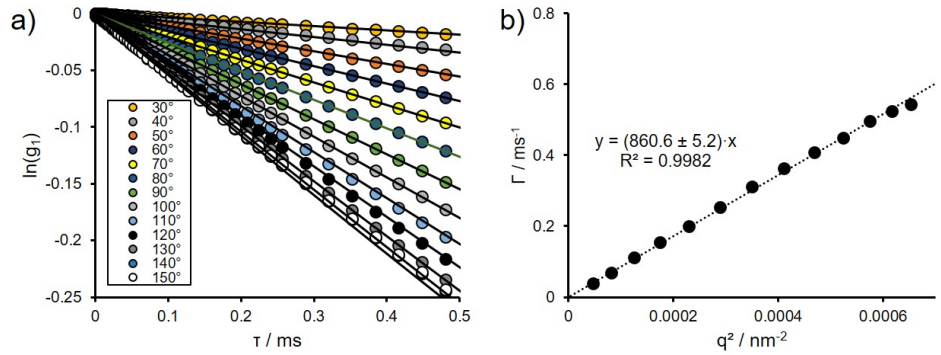

Fig. S3 a) Second order cumulant fits to the linearized field auto-correlation functions $\ln(g_1)$ against lagtime τ at angles from 30°-150° for a filtered microgel dispersion with $c = 0.07\,\mathrm{g\,L^{-1}}$. b) Linear fit of the decay rate Γ against q^2 yielding the diffusion coefficient D as the slope.

S4 Raman spectrum of the microgels

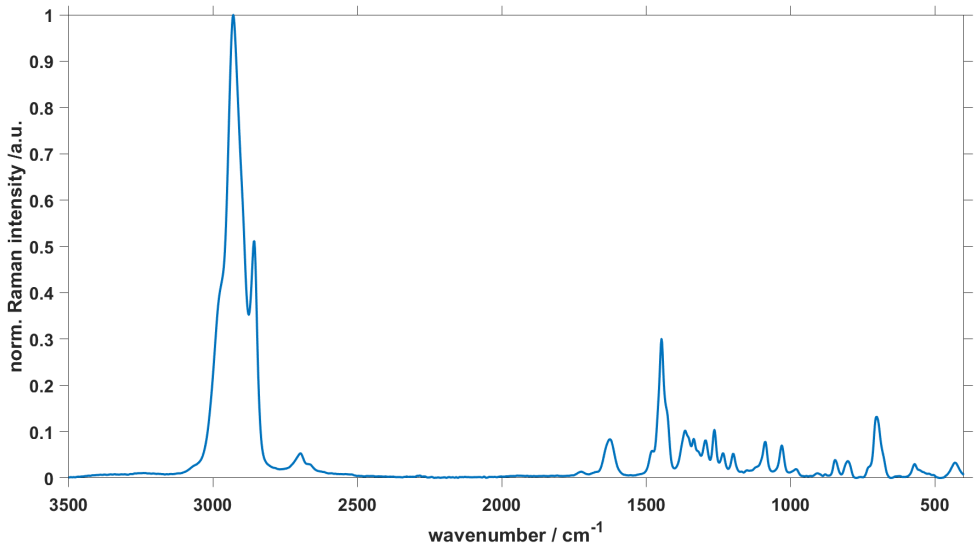

Fig. S4 Raman spectrum of the investigated microgels in dry state. For details see the experimental part of the paper.