Supporting Information

One-Step Photochemical Synthesis of Gold-Polymer Nanohybrids with Engineered Morphologies and Catalytic Activity

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Figure S1-S12

Table S1

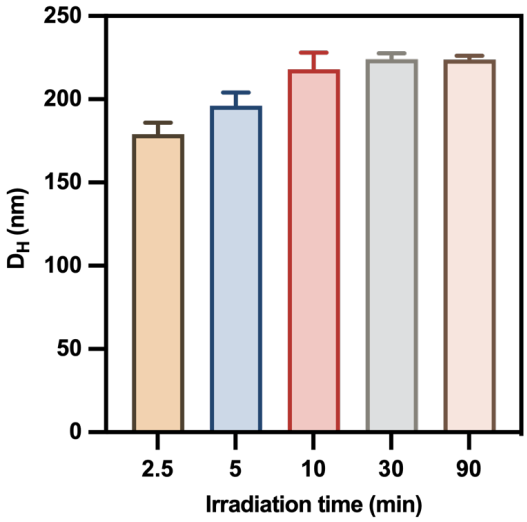

Figure S1. Hydrodynamic diameters (D_H) of H40 samples synthesized with different irradiation times. Error bars represent standard deviation (n = 3).

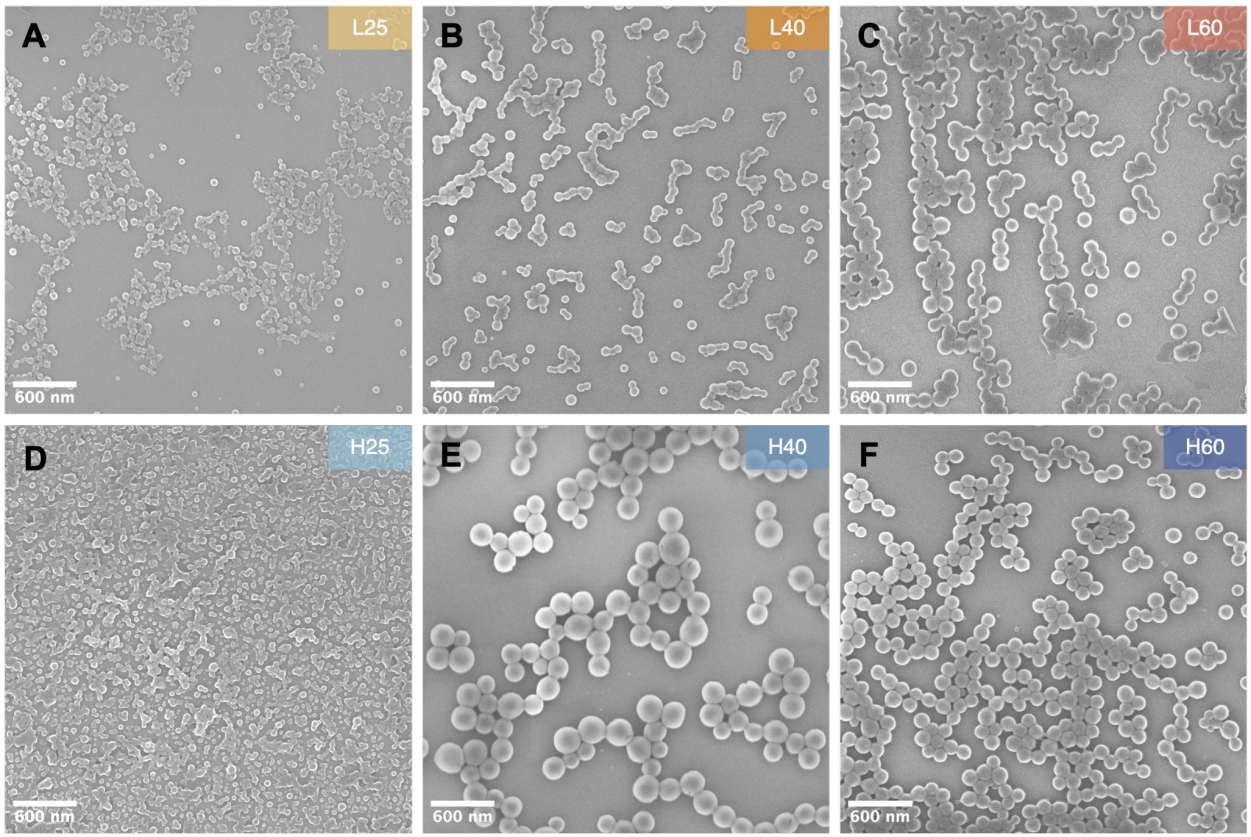

Figure S2. SEM images of hybrid nanogels synthesized under different conditions. Panels show (A) L25 (B) L40 (C) L60 (D) H25 (E) H40 (F) H60.

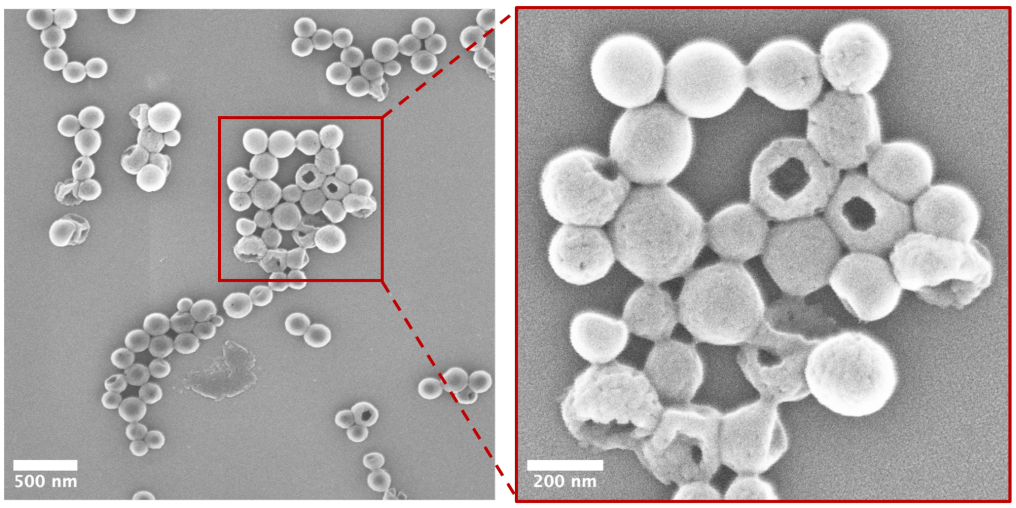

Figure S3. SEM images of H40 nanogels showing surface openings.

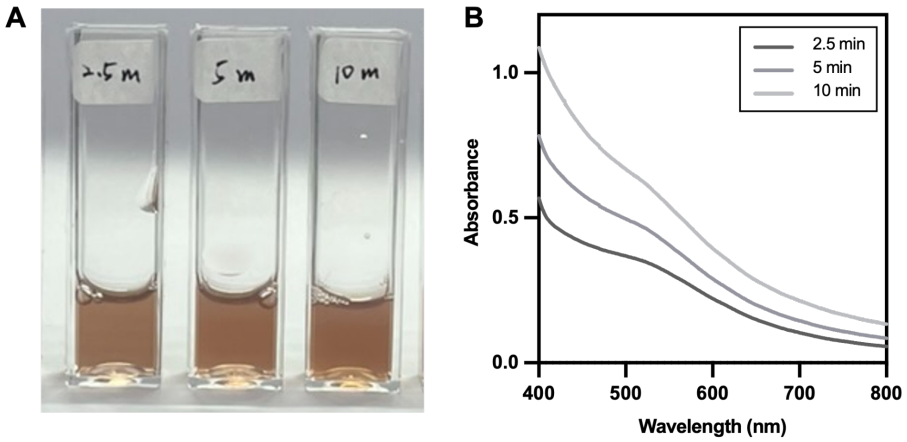

Figure S4. (A) Photograph and (B) UV–Vis spectra of as-synthesized H40 nanogels with irradiation times of 2.5, 5, and 10 minutes.

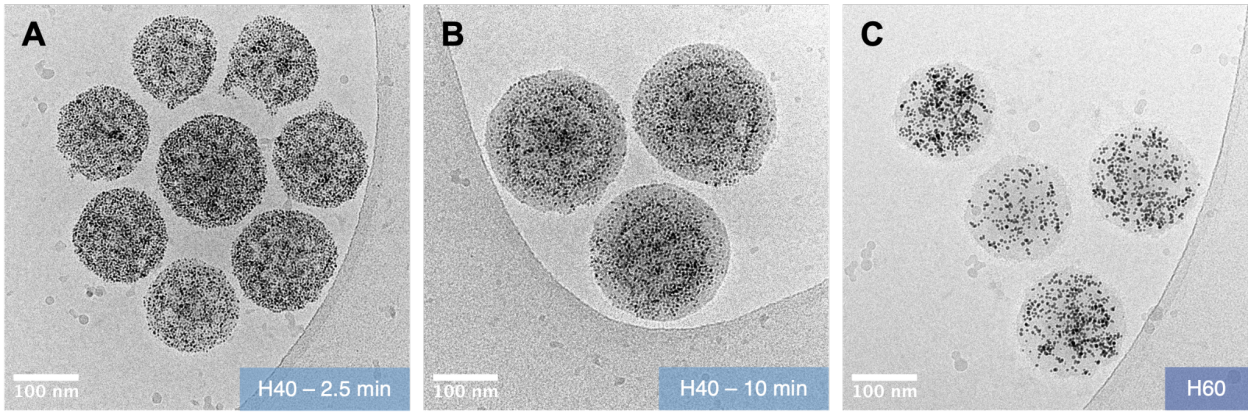

Figure S5. Cryo-TEM images of H40 nanogels after irradiation for (A) 2.5 min and (B) 10 min, and (C) H60 nanogels.

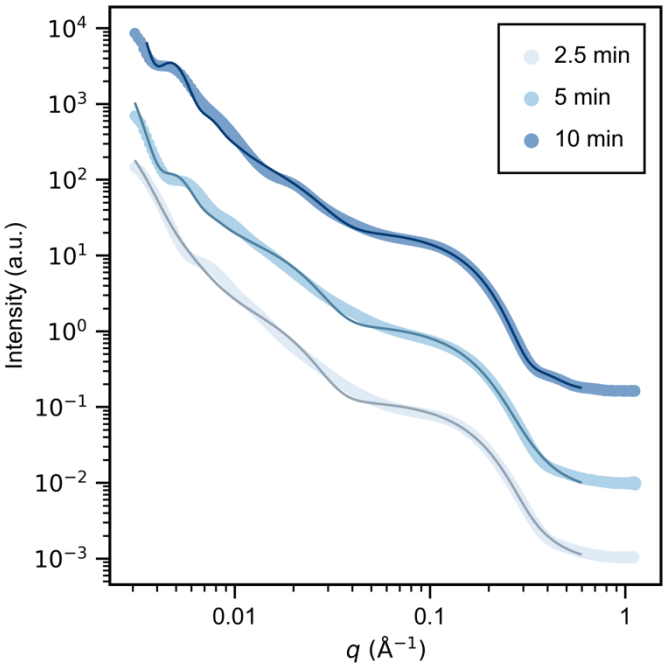

Figure S6. SAXS data of H40 at 2.5, 5, and 10 minutes fitted with a combined model consisting of two sphere functions and a Guinier function.

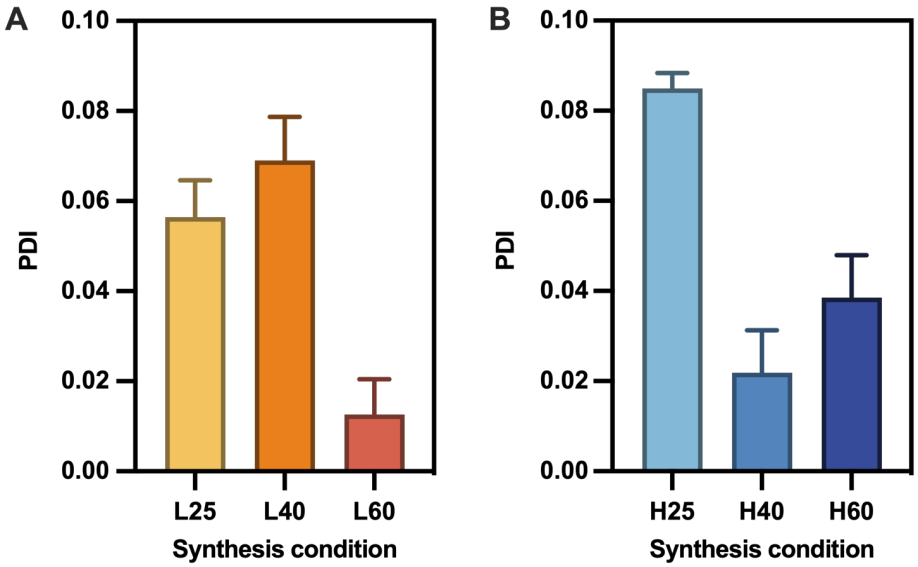

Figure S7. Polydispersity index (PDI) of hybrid nanogels determined by DLS. (A) PDI of L-series. (B) PDI of H-series. Error bars represent standard deviation (n = 3).

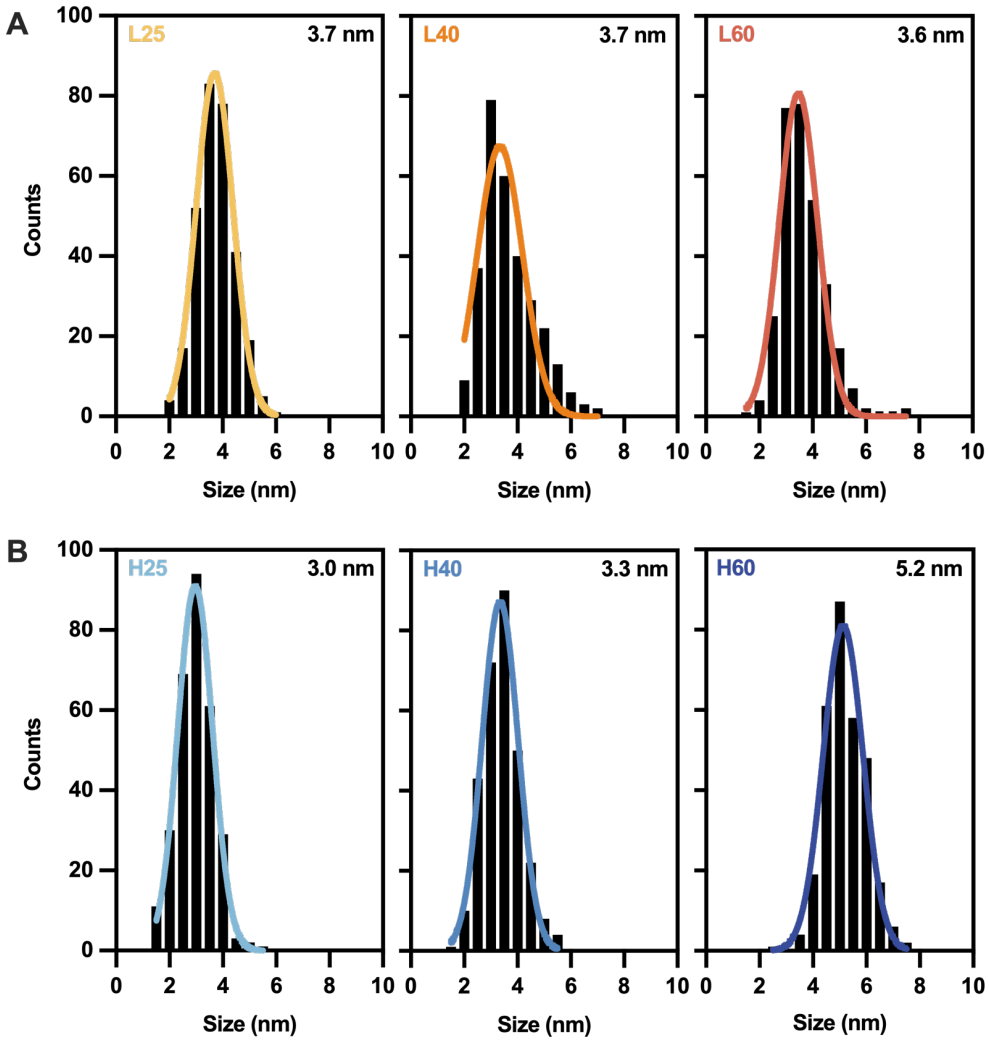

Figure S8. Histograms of AuNP sizes determined from TEM images (n = 300). (A) L-series with average sizes of 3.7, 3.7, and 3.6 nm for L25, L40, and L60, respectively. (B) H-series with average sizes of 3.0, 3.3, and 5.2 nm for H25, H40, and H60, respectively.

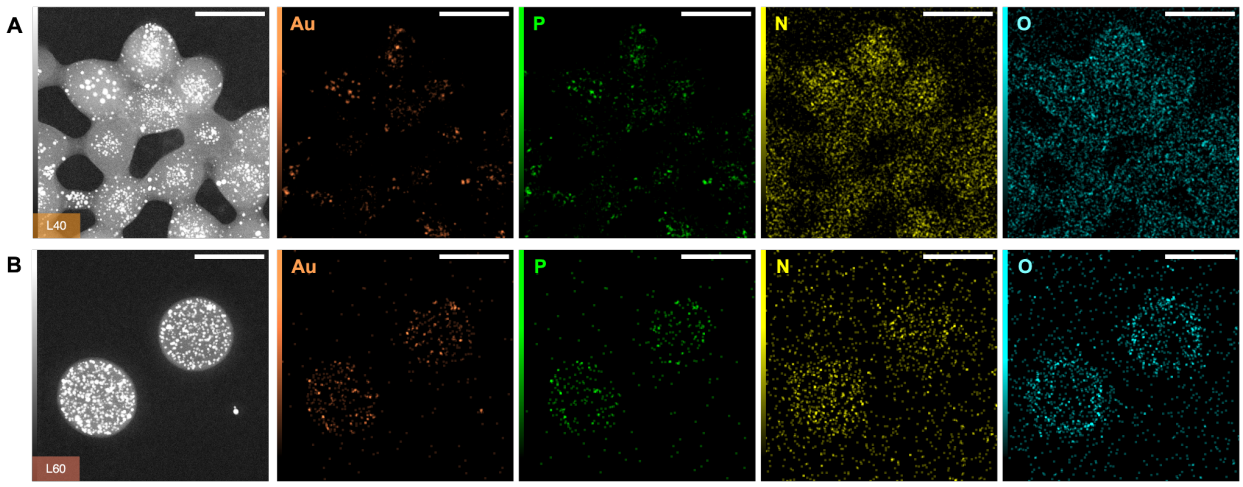

Figure S9. Elemental mapping of Au, P, N, and O obtained by energy-dispersive X-ray spectroscopy (EDS). Panels correspond to L40 (A) and L60 (B) (scale bar = 100 nm).

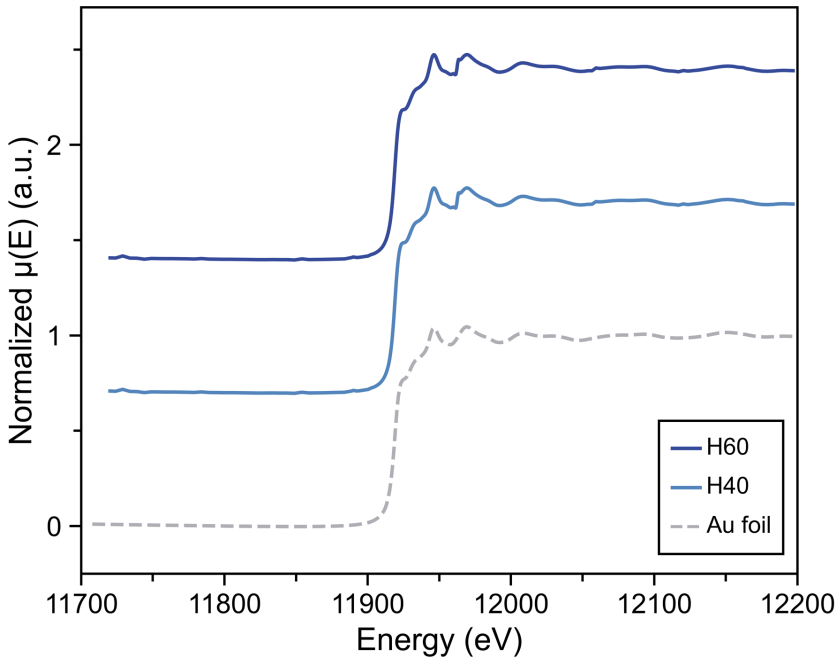

Figure S10. Au L_3-edge XAFS spectra of H40, H60, and Au foil reference.

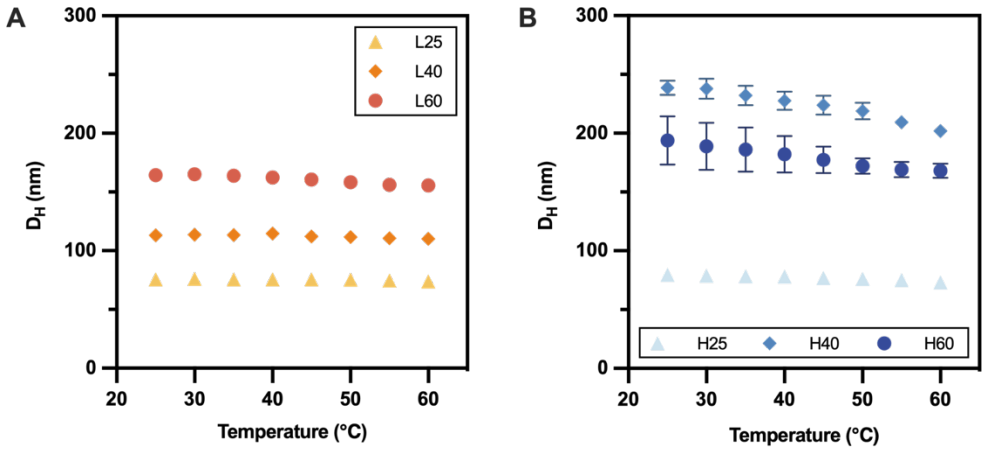

Figure S11. Effect of temperature on hydrodynamic diameter (D_H) of hybrid nanogels, measured from 25 °C to 60 °C at 5 °C intervals. (A) D_H of L-series. (B) D_H of H-series. Error bars represent standard deviation (n = 3).

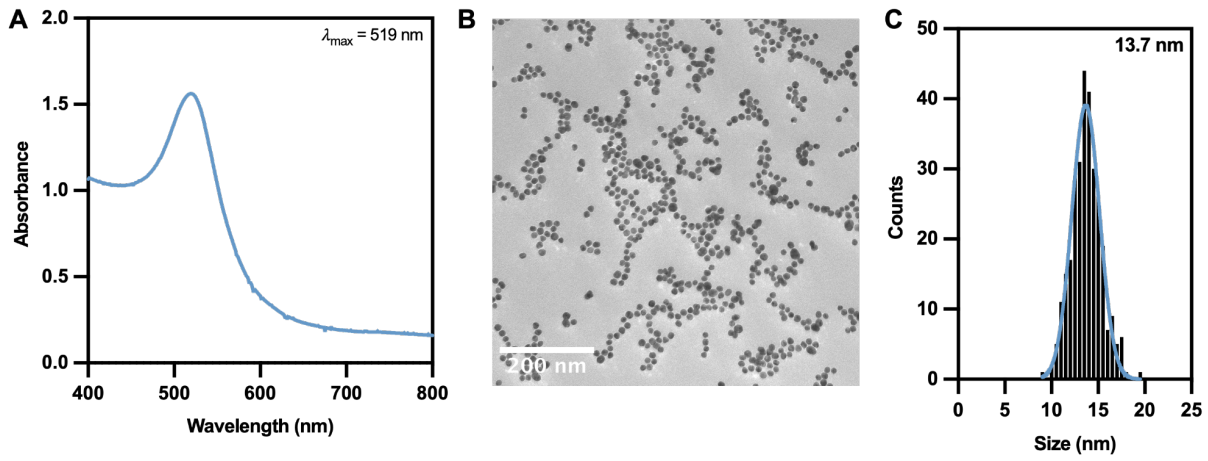

Figure S12. Characterization of synthesized citrate-capped AuNPs. (A) UV–Vis spectrum with λ_{max} at 519 nm. (B) TEM image. (C) Size histogram obtained from TEM images.

Table S1. Results obtained from SAXS data fittings using a combined core–shell, sphere, and Guinier model.

Sample	Core radius (Å)	Shell thickness (Å)	AuNP radius (Å)	R_g (Å) [a]
2.5 min	504	71.8	10.6	646
5 min	685.8	75	10.23	859.6
10 min	636.8	300.6	12.01	74.07

[a] Radius of gyration (R_g) was determined from the Guinier term of the fitting models.