

# Supplemental material for: Improving the size distribution of polymeric oblates fabricated by the emulsion-in-gel deformation method

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Fig. S1 shows a sketch of the custom-made press for the gel sample deformation.

A rectangular parallelepiped sample is placed in the glass sample cell, covered with a rectangular glass slide, and pressed down by screwing the sliding cylinder until the brick width is equal to the width of the cell. The sample height is reduced from about 7 to 4 mm, which corresponds to 57% of deformation. Such deformation is uniform and uni-axial under constant temperature.

Fig. S2 shows particle size distributions obtained from the analysis of SEM images before and after droplet deformation.

Fig. S3 shows particle size distributions obtained by DLS for initial spherical particles E6 and ellipsoids EGD6 before fractionation.

Fig. S4 shows particle size distributions obtained from the analysis of SEM images of the four fractions of sample EGD4 after differential centrifugation.

Fig. S5 shows particle size distributions obtained from the analysis of SEM images of five fractions obtained by the Bibette fractionation method from sample EGD5.

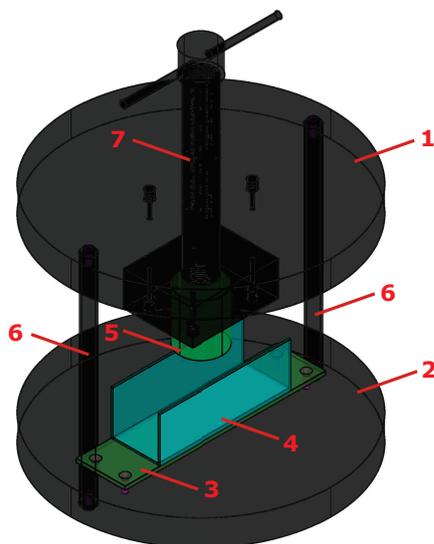
Fig. S6 shows particle size distributions obtained from the analysis of SEM images of five fractions obtained by fractionation in a sucrose density gradient of sample EGD5.

Fig. S7 shows particle size distributions obtained from the analysis of SEM images of five fractions obtained by iterative differential centrifugation of sample EGD5.

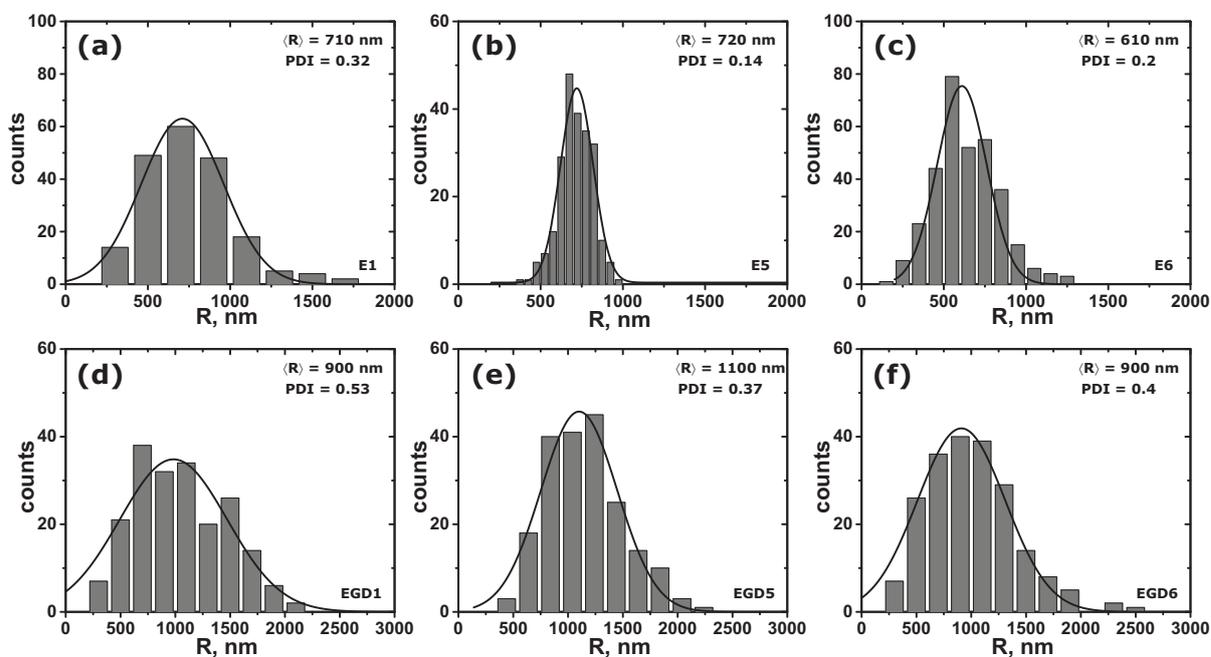
Fig. S8 shows light microscopy images of EGD5F2 particles (obtained by iterative centrifugation) 1 day and 14 days after sample preparation in water. Ellipsoids are stabilized by SDS. The stabilization was performed by dispersing 40 mg of sample in 15 mL of 10 mM SDS solution, leaving the particles for 24 h, and then removing the excess SDS by sedimentation-redispersion cycles. The measured particle  $\zeta$ -potential (Zeta Sizer Nano ZS, Malvern Panalytical) in these conditions was found to be  $-71.2 \pm 4.6$  mV. This corresponds to generally kinetically stable systems, which is in agreement with what is observed in Fig. S8. After 1 day, particles are well dispersed, while after 14 days, small aggregates are formed; however, the particles in the aggregates do not touch and present Brownian motion, indicating flocculation in the secondary potential minimum.

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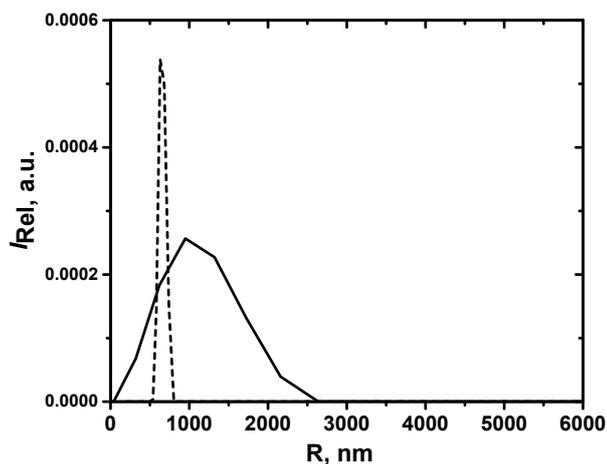
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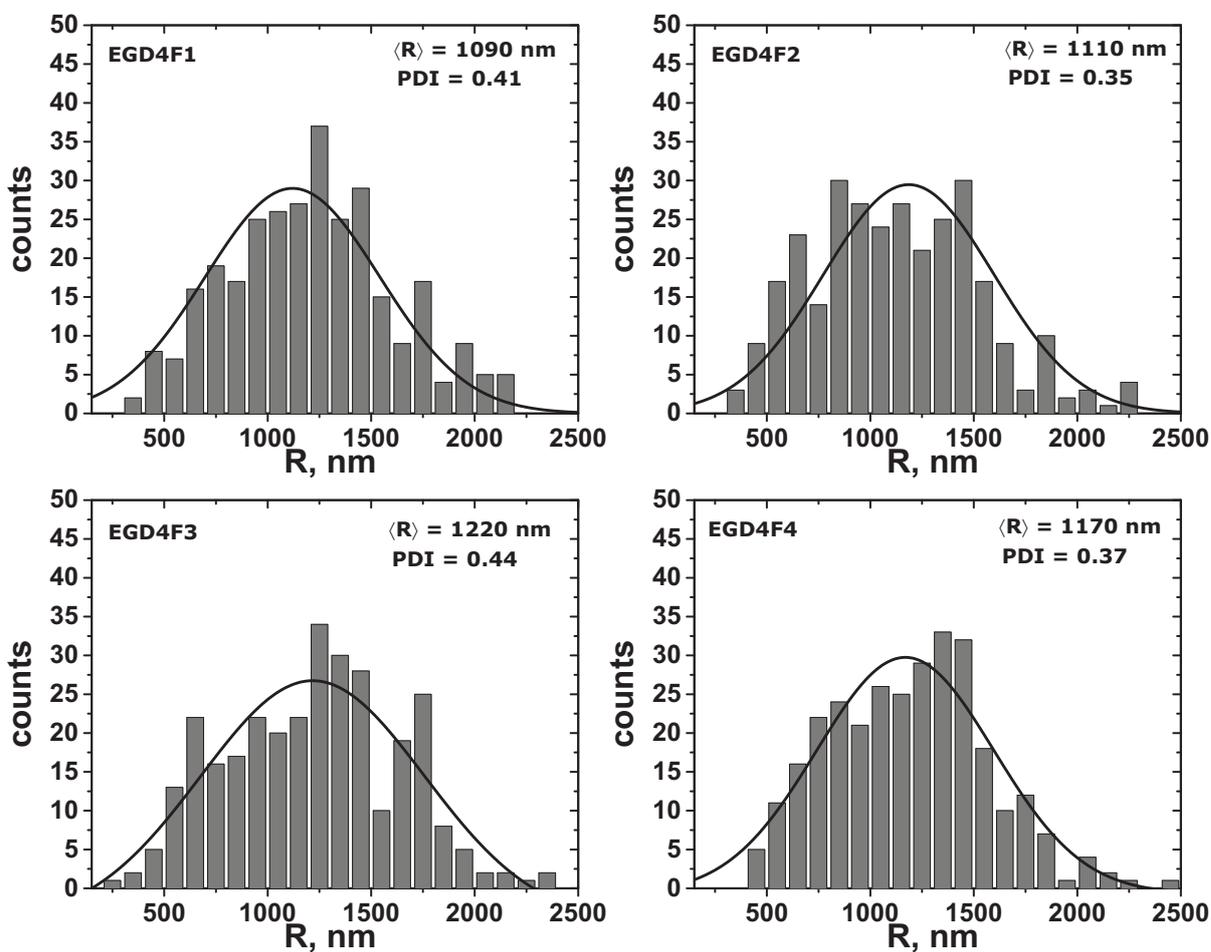
**Figure S1.** Schematic representation of the custom-made press for the gel sample deformation: (1) metallic lid; (2) metallic base; (3) PTFE center groove; (4) glass sample cell; (5) PTFE press sliding cylinder; (6) sliding rails; (7) screw sliding cylinder.



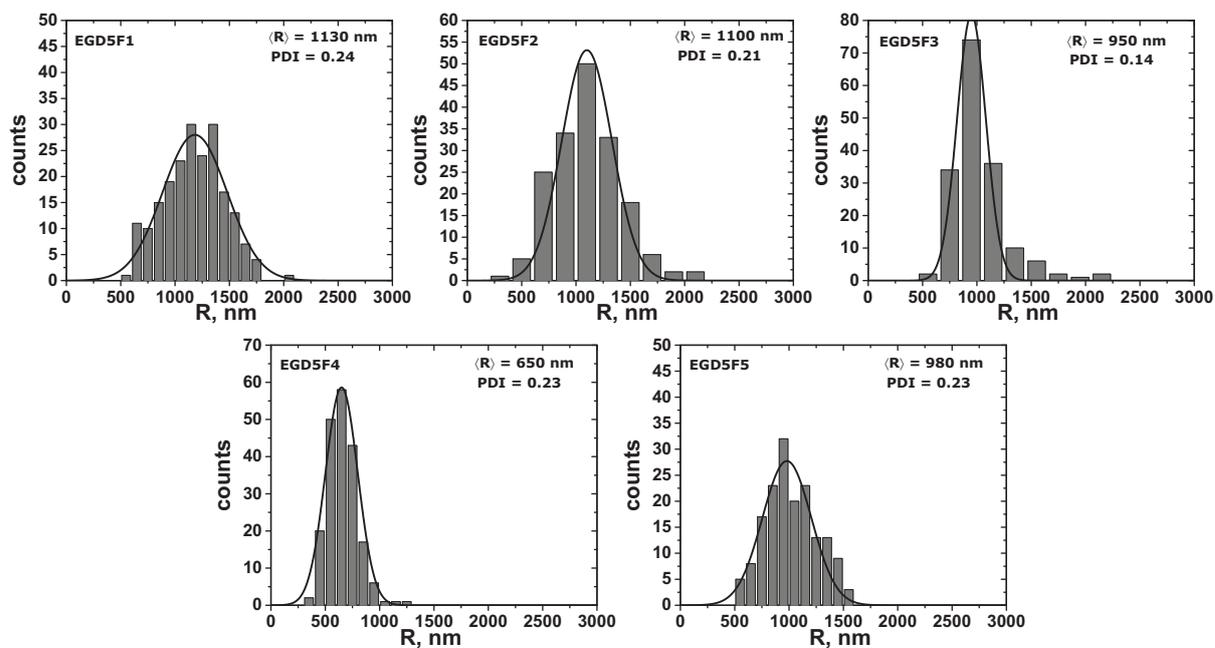
**Figure S2.** Particle size distributions obtained from the analysis of SEM images of spherical polymeric particles solidified in emulsion before droplet deformation (upper row) and deformed particles obtained from the corresponding emulsions (lower row): (a) E1, (b) E5, (c) E6, (d) EGD1, (e) EGD5, and (f) EGD6.



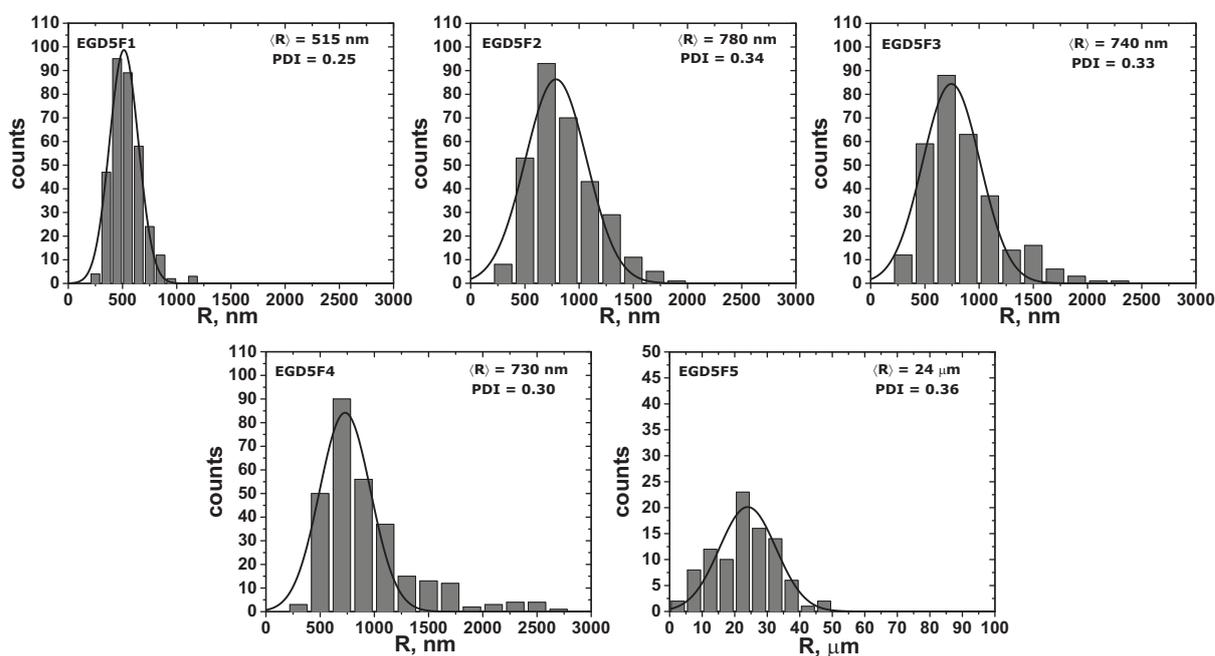
**Figure S3.** Size distributions of particles obtained from DLS using the CONTIN method: spherical particles E6 (black dashed line) and deformed initial EGD6 oblates (black solid line).



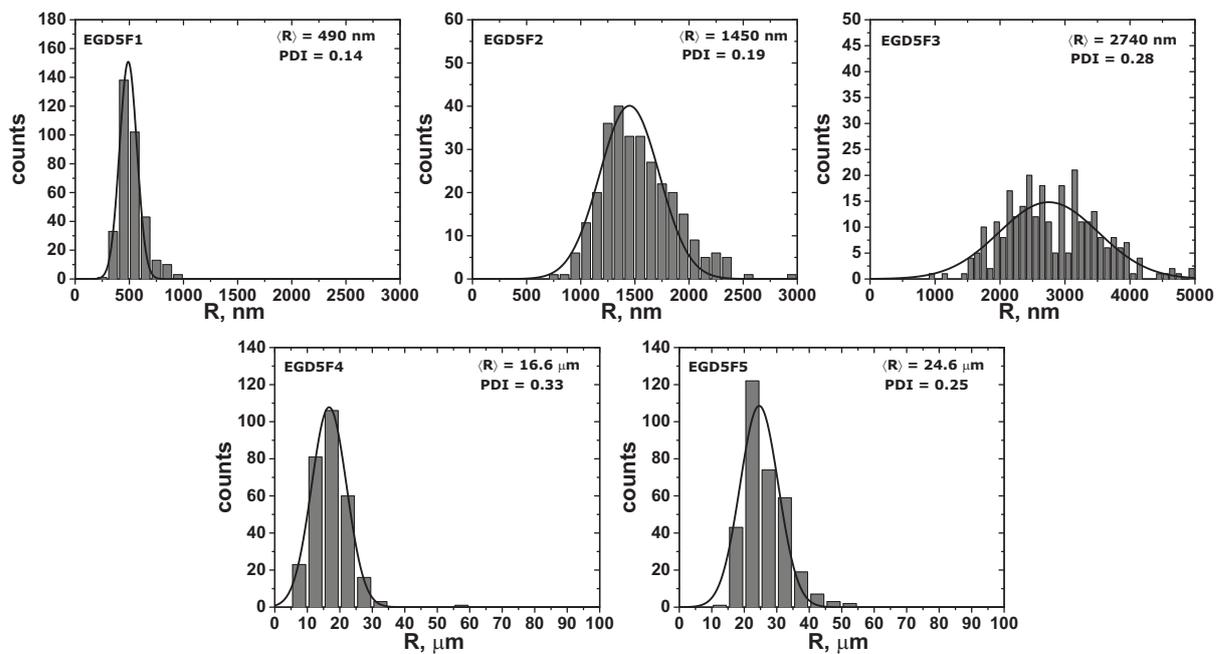
**Figure S4.** Particle size distributions obtained from the analysis of SEM images of the four fractions of sample EGD4 (as given in the legend) after differential centrifugation.



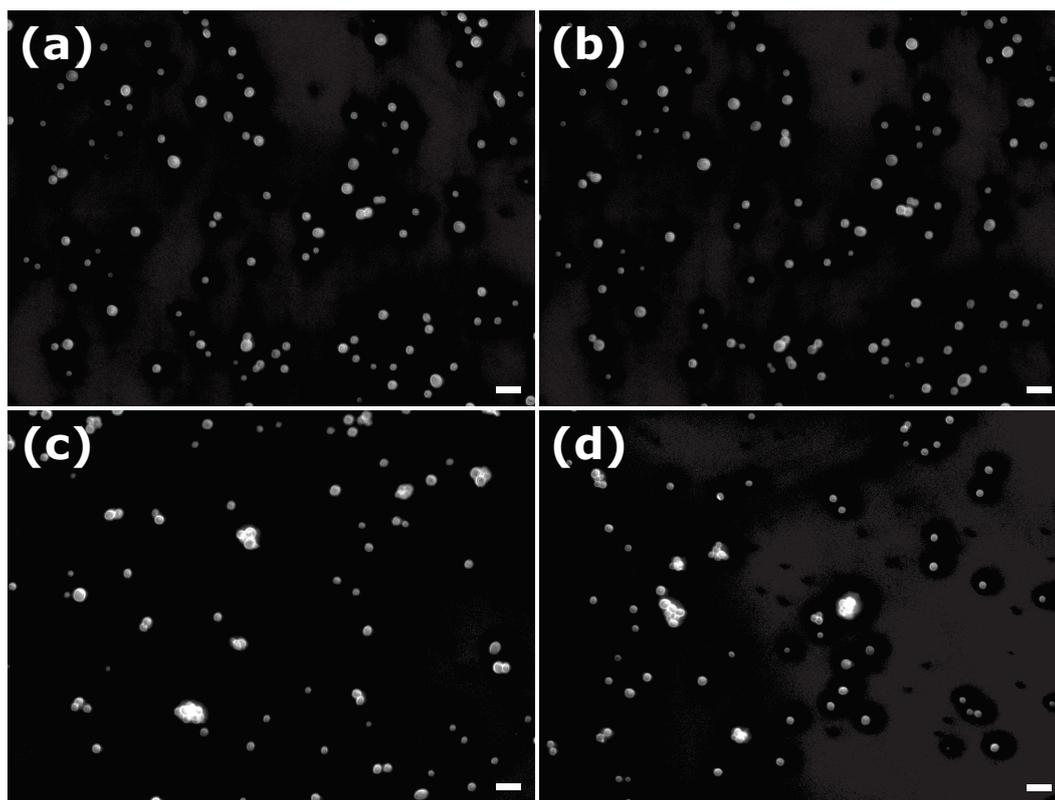
**Figure S5.** Particle size distributions obtained from the analysis of SEM images of the five fractions of sample EGD5 (as given in the legend) after the Bibette fractionation method.



**Figure S6.** Particle size distributions obtained from the analysis of SEM images of the five fractions of sample EGD5 (as given in the legend) after fractionation in a sucrose density gradient.



**Figure S7.** Particle size distributions obtained from the analysis of SEM images of the five fractions of sample EGD5 (as given in the legend) after iterative differential centrifugation.



**Figure S8.** Light microscopy images taken 1 day (a), (b), and 14 days (c), (d) after preparation of sample EGD5F2 (obtained by iterative centrifugation) by dispersion in water. Scale bars = 10  $\mu\text{m}$ .