Internal structure and phase transition behavior of stimuli-responsive microgels in PEG melts

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S1. Sample Container

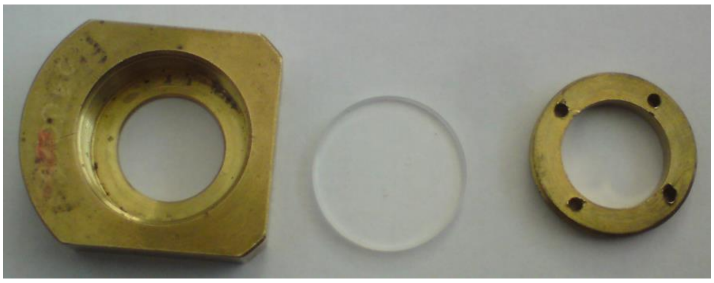

Fig. 1 Sample container for SANS measurements at KWS-1, MLZ, Munich; (left) outer part (middle) one out of two windows, (right) frame to screw the glass window in the outer part.

S2. Sample in Sample Container ($T < T_{c,PEG}$)

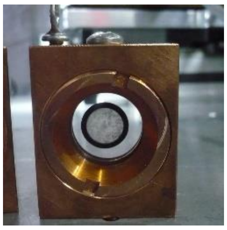

Fig. S2 Sample in sample container (in the middle of the black sealing ring) (at CG2, HFIR, Oak Ridge). Same principle as the sample container displayed in Fig. S1. Two glass windows keep the sample together. The black Viton sealing ring suppresses the polymer flowing out of the sample container and ensures the correct sample thickness. Viton was used to avoid thermal degradation at the measurement temperatures, up to 200 °C. After screwing the frames, see. Fig. 1 (right) together, the sample thickness was ~ 1 mm, and this thickness was kept constant by the spacer sealing ring. At ambient temperature (~23°C) the sample is below Tm (Tm ~ 53 – 75 °C) [24], i.e. PEG is crystalline. Therefore, the picture shows a sample that is opaque.

S3. Comparison Samples at $T > T_{c,PEG}$

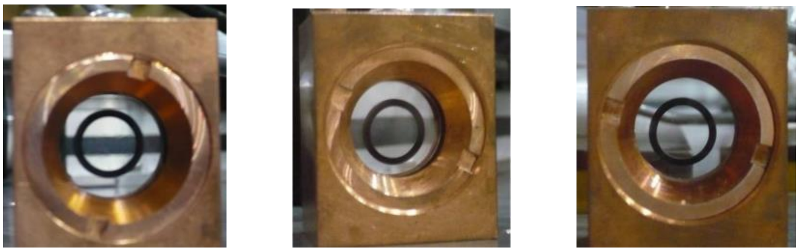

Fig. S3 PEG (2k) samples directly after measurements (CG2, HFIR, Oak Ridge, Munich; $T > T_c$); From left to right: (left) pure PEG 2k, (middle) PEG + 0.5 vol% PVCL, and (right) PEG + 5 vol% PVCL; We observe in all three cases transparent samples.

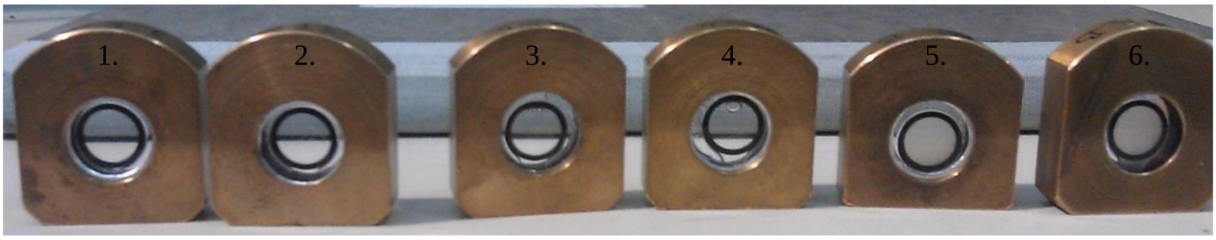

Fig. S4 Samples directly after measurements (KWS-1, MLZ, Munich; $T > T_c$); From left to right: 1. 2k + 0.5 vol-% PVCL, 2. 3k, 3. 25k, 4. 10k, 5. 25k + 0.5 vol-% PVCL, and 6. 10k + 0.5 vol-% PVCL. We obtain 3 results: (i) Pure PEG is transparent; (ii) If we add 0.5 vol% PVCL to low molecular weight PEG, the sample is transparent, and (iii) if we add 0.5 vol% to 10k or 25k, the sample is opaque. Please note, the SANS experiment in Figs. 2 and Fig. 3 show structures with a diameter larger than 400 nm, well compatible with these photographs.

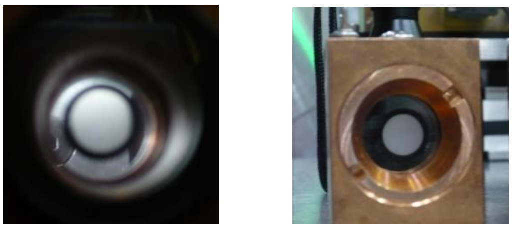

Fig. S5 PEG (80k) samples directly after measurements (GP-SANS, HFIR, Oak Ridge; $T > T_c$); From left to right: (left) PEG 80k + 0.5 vol%; (right) PEG 80k+ 5 vol% PVCL; We observe in all two cases opaque samples.