Effects of supersaturation on the structure and properties of Poly(9,9 dioctyl fluorene) organogels.

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Supporting Figures

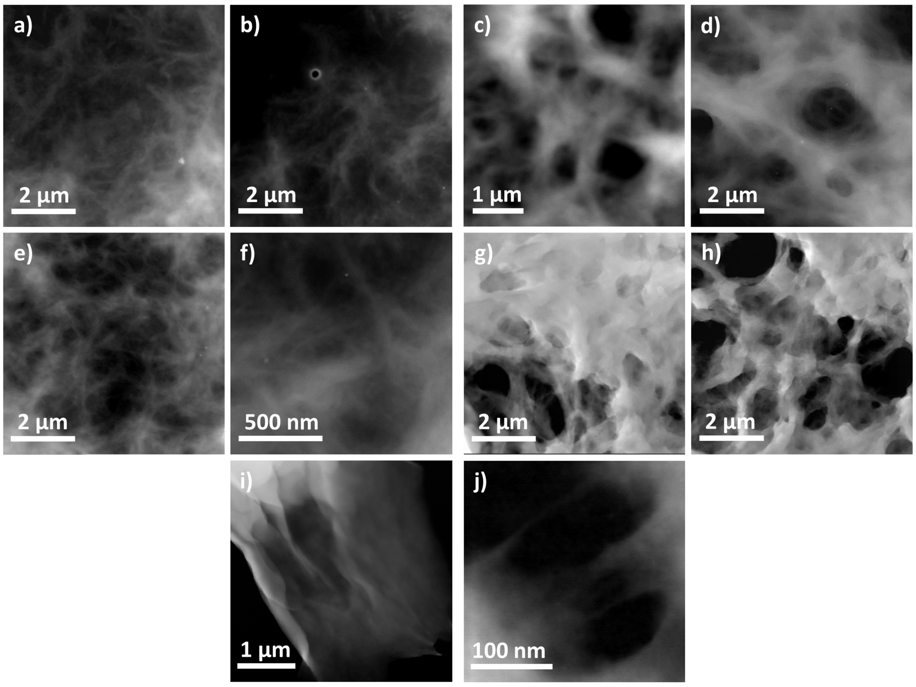

Figure S1: sTEM, images of organogels form in different solvents. a, b) Toluene, c,d) m-xylene, e,f) mesityele, g,h) dodecane, i,j) o-dichlorobenzene.

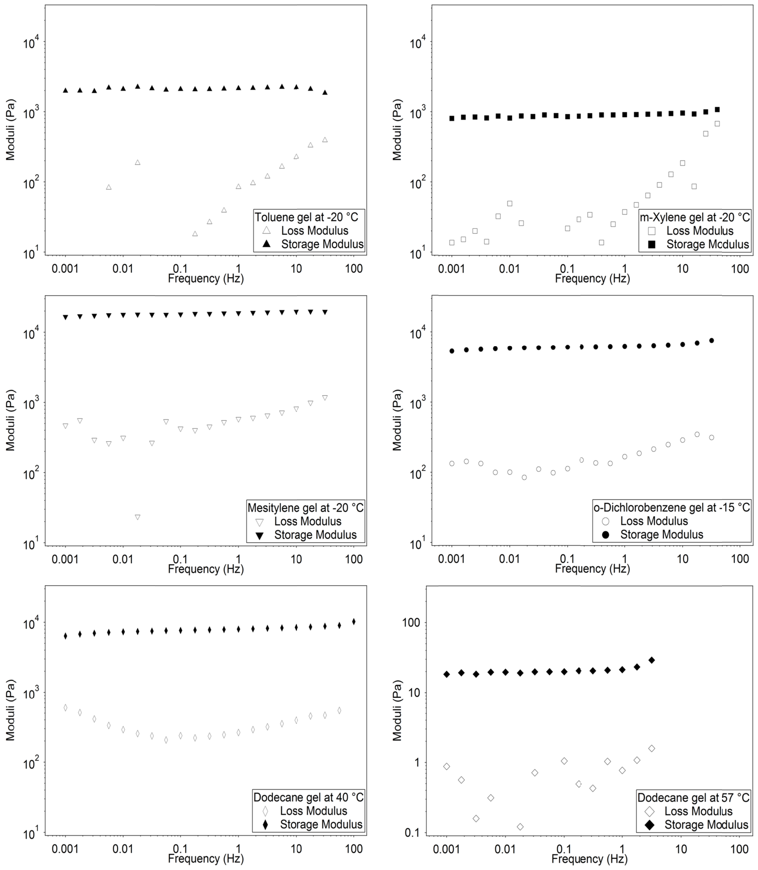

Figure S2: Frequency sweeps of fully developed gels on 5 different solvents. The bottom two curves are for gels in dodecane formed at 40°C and 57°C. All the samples behave as gels during the entire frequency range.

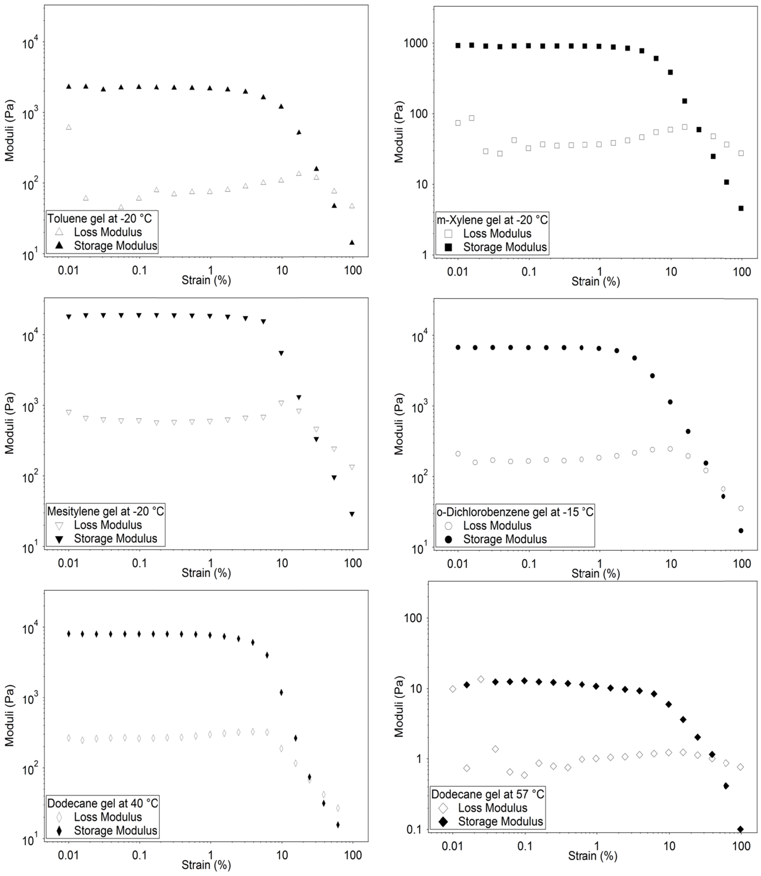

Figure S3: Strain sweeps of fully developed gels in 5 different solvents. The bottom two curves are gels formed in dodecane at 40°C and 57°C. Based on these curves, a strain of 0.1% was chosen in order to ensure to be within the linear viscoelastic regime of the sample.

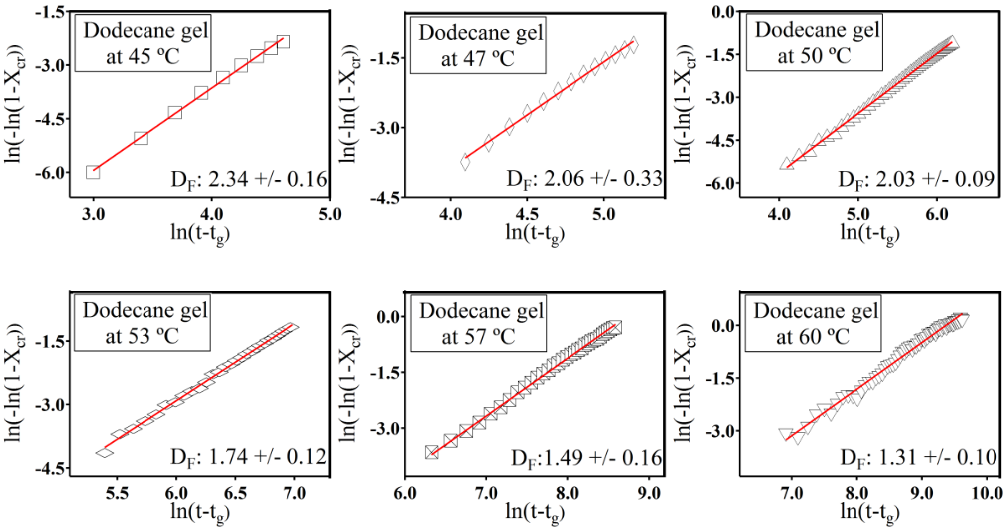

Figure S4: Fits to the rheological data of dodecane gel samples formed at different temperatures. The fits are performed using Liu's model for the kinetics of crystallization[1].

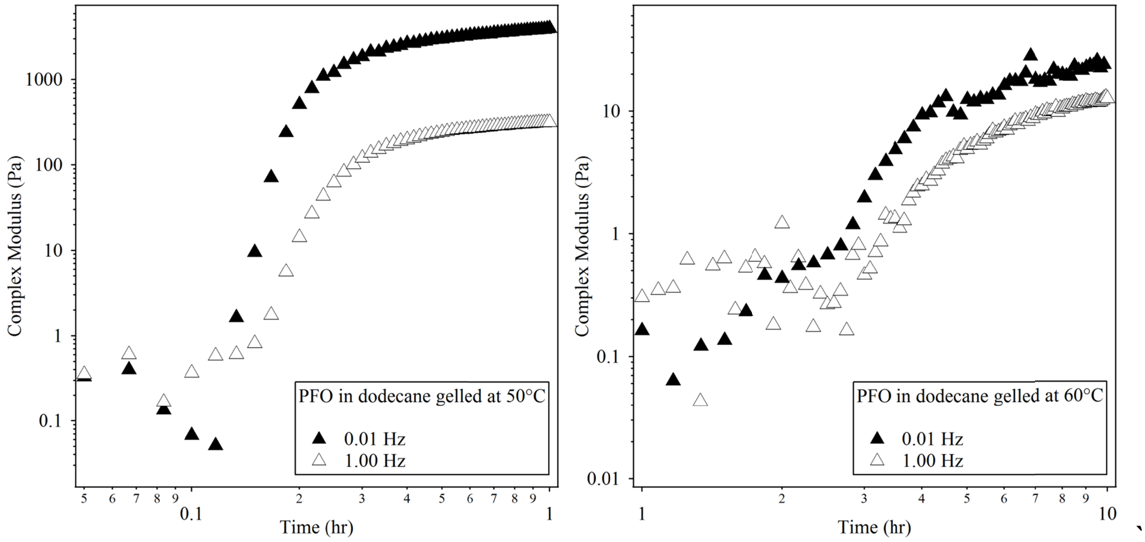

Figure S5: Gelation kinetics of a PFO dodecane system produced at two different temperatures: left 50°C, right 60°C. The gelation kinetics of these samples is probed using two different perturbation frequencies, 0.01 and 1 Hz. The time of gelation is basically the same at both probe frequencies. However, the maximum complex modulus increased at lower frequencies for both temperatures.

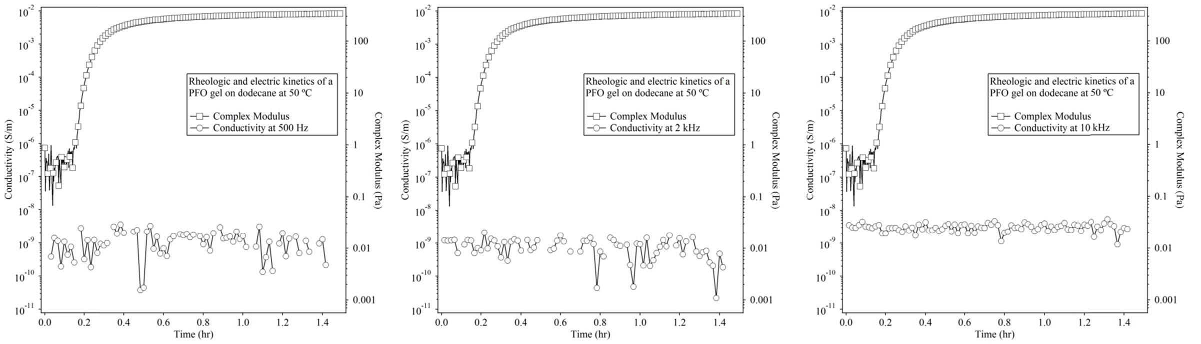

Figure S6: Simultaneous electrical and rheological measurements of a PFO sample in dodecane gelled at 50°C. The conductivity of the sample was tracked using round electrodes with 50 mm in diameter and a gap separation of 0.2 mm. The voltage perturbation used was 1 V, and three different frequencies were probed 0.5, 2 and 10 kHz. The conductivity did not show any measurable change as the sample transitions from sol to gel at any of the probed frequencies.

In order to probe the crystallinity of poly (9,9 dioctyl fluorene) (PFO) in a gel phase, wide-angle x-ray scattering (WAXS) is performed on a PFO-toluene system. X-ray scattering is performed at the University of Washington in Seattle. An Anton Paar SAXSess (Anton-Paar, Graz, Austria) instrument is used with a line collimation and a Cu Kα source with a wavelength of 1.54Å. The sample is prepared by making a 30 mg/ml PFO in toluene solution. The solution is loaded into a quartz capillarity with 1.5 mm diameter. The sample is then allowed to sit in the freezer at -20°C overnight to allow for complete gel formation. The open capillarity is then placed at 30°C for three days to allow for toluene evaporation. According to figure 3 of the main manuscript, at this temperature the toluene evaporation is accelerated and the gel structure is still maintained. Finally, the uncapped capillarity is put under vacuum for three additional hours in order to fully remove the solvent before exposing to the x-ray beam. A second capillarity with a poly (3-hexyl thiophene) (P3HT) organogel formed in toluene is used as a comparison. Figure S5 contains the scattering profiles for both samples after background subtraction for quartz. X-ray scattering shows several prominent peaks in each sample. P3HT peaks correspond to the typical 100, 200, 300 and 010 planes[2]. However, note that the 010 peak of P3HT is especially prominent indicating long correlations and effective pi-pi stacking leading to increased conductivity upon gelation. For PFO the peak spacing is also characteristic of the crystalline α phase as reported in previous work[3].

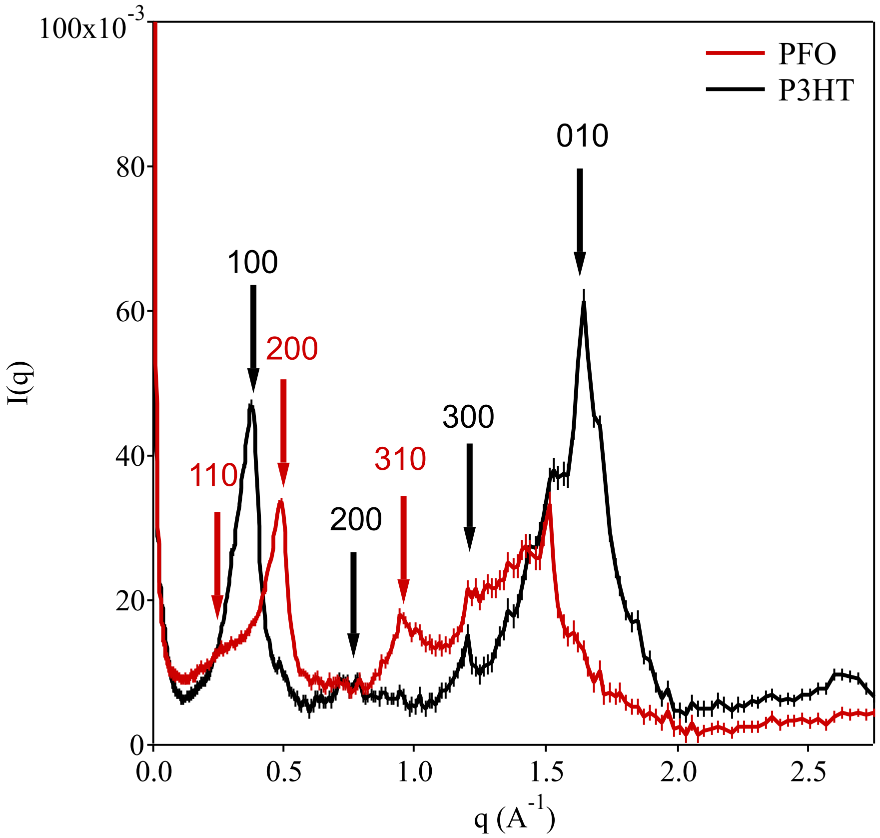

Figure S7: Wide angle x-ray scattering profile of dried PFO and P3HT organogels.

References

1. J.-L. Li and X.-Y. Liu, *Advanced Functional Materials*, 2010, **20**, 3196-3216.
2. K. Aasmundtveit, E. Samuelsen, M. Guldstein, C. Steinsland, O. Flornes, C. Fagermo, T. Seeberg, L. Pettersson, O. Inganas, R. Feidenhans'l and S. Ferrer, *MACROMOLECULES*, 2000, **33**, 3120-3127.
3. S. H. Chen, A. C. Su, C. H. Su and S. A. Chen, *Macromolecules*, 2005, **38**, 379-385.