## Supporting Information: Branching and alignment in reverse worm-like micelles studied with simultaneous dielectric spectroscopy and RheoSANS

John K. Riley<sup>1</sup>, Jeffrey J. Richards<sup>1</sup>, Norman J. Wagner<sup>2</sup>, Paul D. Butler<sup>1</sup>

<sup>1</sup>Center for Neutron Research, National Institute of Standards and Technology, Gaithersburg, MD, 20899-6100

<sup>2</sup>Department of Chemical and Biomolecular Engineering, University of Delaware, Newark, DE, 19716



Soy PC 95% - Avanti Number 441601



**Figure S1**. Representative molecular structure of soy lecithin and manufacturer provided tail group distribution (from website, https://avantilipids.com/product/840054/)





**Figure S2**. Annular average SANS profiles for 75 mg/mL decane reverse WLMs as a function of shear rate around a central scattering vector of 0.035 Å<sup>-1</sup> used to calculate alignment factors presented in main text Figure 8.



**Figure S3**. Annular average SANS profiles for 75 mg/mL cyclohexane reverse WLMs as a function of shear rate around a central scattering vector of 0.035 Å<sup>-1</sup> used to calculate alignment factors presented in main text Figure 8.



**Figure S4**. Circularly averaged SANS profiles for decane-d22 and cyclohexane-d12 WLMs at rest, 75 mg/mL. The low-q scattering is depressed by the presence of a strong structure factor due to overlap.



**Figure S5**. Annular average SANS profiles for 50 mg/mL decane reverse WLMs (W=2.8) as a function of shear rate around a central scattering vector of 0.035 Å<sup>-1</sup> used to calculate alignment factors presented in main text Figure 7.



**Figure S6**. Circular average 1-D SANS profiles for 50 mg/mL decane reverse WLMs (*W*=2.8) as a function of shear rate. Arrow indicate direction of increasing shear rate.



**Figure S7**. Circular average 1-D SANS profiles for 50 mg/mL decane reverse WLMs (*W*=2.4) as a function of shear rate. Arrows indicate direction of increasing shear rate.



**Figure S8**. Annular average SANS profiles for 50 mg/mL decane reverse WLMs (W=2.4) as a function of shear rate around a central scattering vector of 0.035 Å<sup>-1</sup> used to calculate alignment factors presented in main text Figure 7.



**Figure S9**. Conductivity spectra of as-prepared reverse WLMs (75 mg/mL, W=2.8) in decane compared to the pure deuterated solvent.



**Figure S10**. Dielectric spectra for 75 mg/mL linear WLMs in cyclohexane as a function of shear rate. Feature of these dielectric spectra are plotted in main text Figure 8.



Figure S11. Dielectric spectra for 75 mg/mL branched WLMs in decane (W=2.8) as a function of shear rate. Feature of these dielectric spectra are plotted in main text Figure 8.

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**Figure S12**. Permission from AIP for reproduction of couette Dielectric RheoSANS cell in main text Figure 1.

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