Supplementary Information to Controlled viscoelastic particle encapsulation in microfluidic devices

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S1. Water in oil droplet formation in a hydrophobic T-Junction

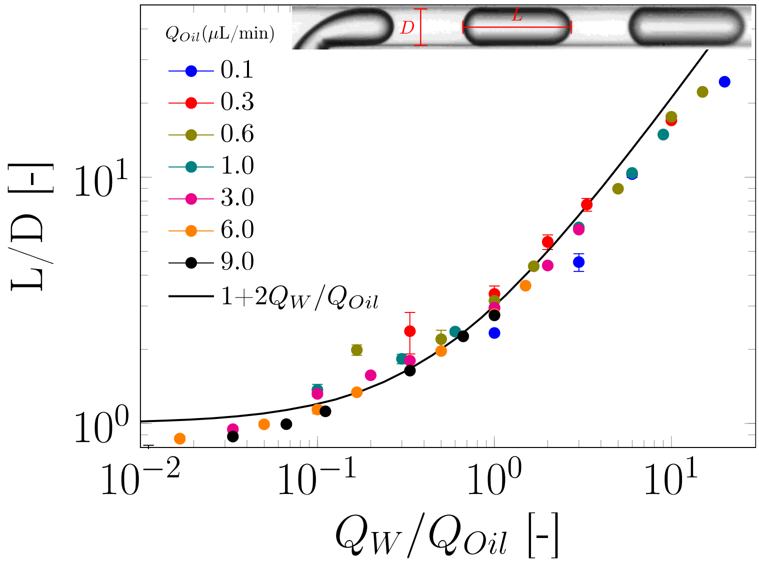

Figure S1: Water in oil droplet formation in a hydrophobic T-Junction. Droplet size is linearly proportional to the ratio of dispersed to continues flow rate.

S2. Critical dispersed XG flow rate for transition from stable to unstable droplet generation.

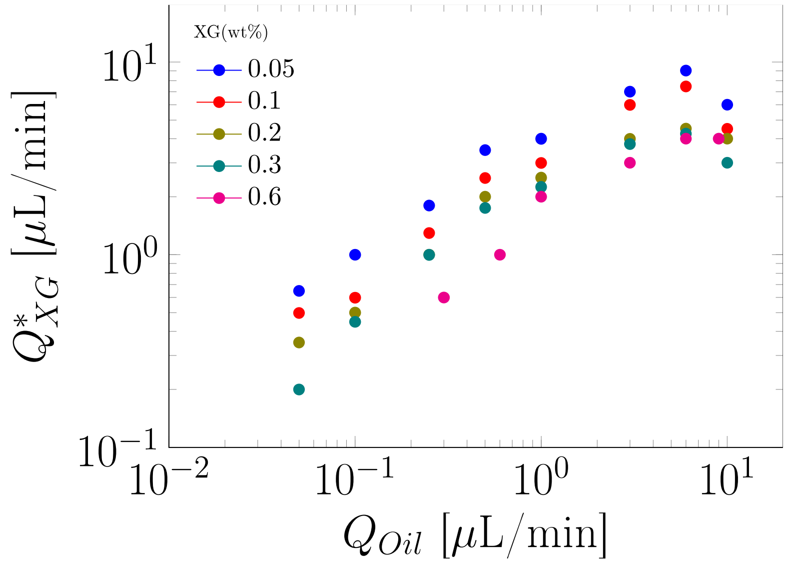

Figure S2: Critical dispersed XG flow rate for transition from stable to unstable droplet generation. Transition point is proportional to continuous phase flow rate and inversely change with XG concentration.

S3. Relative frequency of particles per droplet for particle suspension flowing in the short channel.

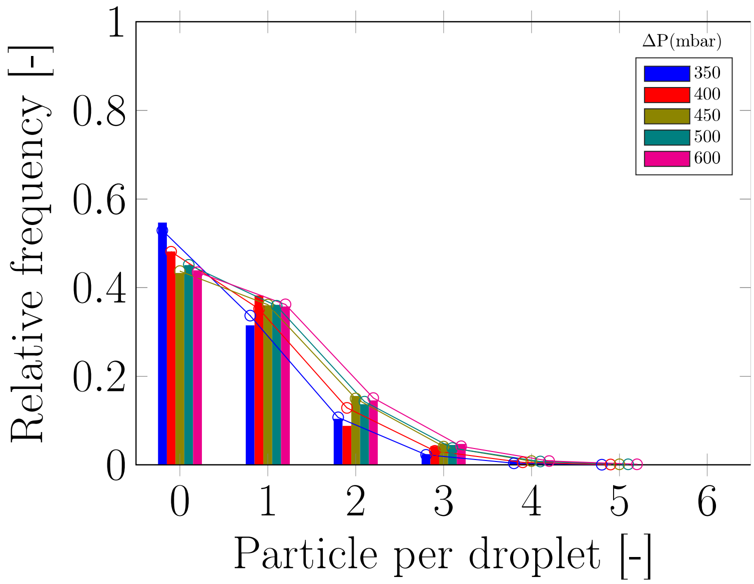

Figure S3: Relative frequency of particles per droplet for particle suspension flowing in the short channel. The experimental data is compared with Poisson's statistics which suggest that the short channel length is not enough to reach an ordered structure before encapsulation at the T-junction. XG concentration is 0.1 wt%, oil flow rate Q_{oil} = 5 µL/min and XG flow effected by pressure drop (ΔP) in range of 350 - 600 mbar.

S4. Relative frequency of normalised inter-particle spacing and particles per droplet for particle suspension flowing in the long channel.

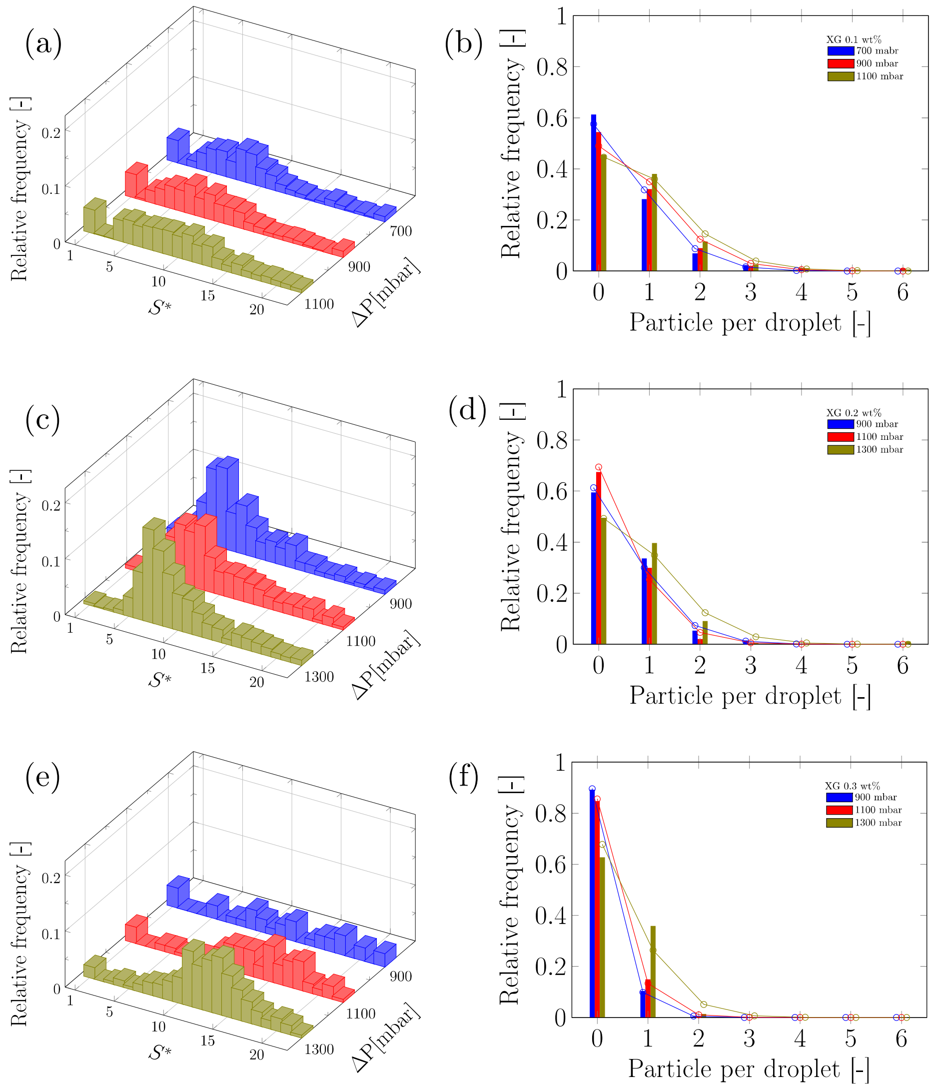

Figure S4: Relative frequency of normalised inter-particle spacing and particles per droplet for particle suspension flowing in the long channel. (a)-(b) XG 0.1 wt%, Q_{oil} = 9 µL/min (c)-(d) XG 0.2 wt%, Q_{oil} = 12 µL/min (e)-(f) XG 0.3 wt%, Q_{oil} = 9 µL/min. The experimental data is compared with Poisson's statistics which suggest that the long channel length was enough to reach an ordered structure before encapsulation at the T-junction.

S5. Snapshot of the system for XG 0.05 wt% at different flow rate.

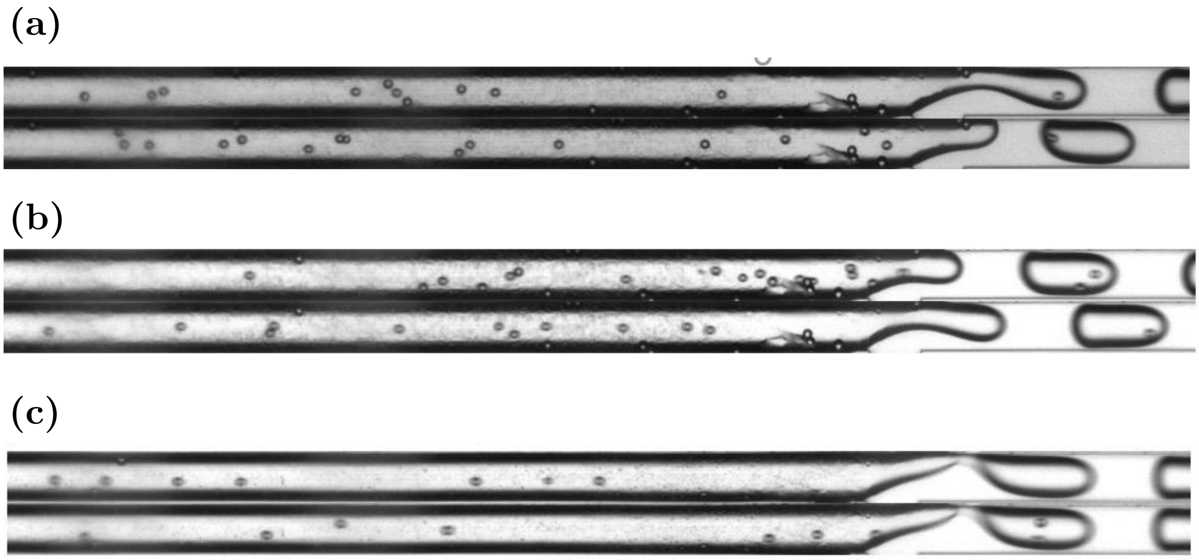

Figure S5: Snapshot of the system for XG 0.05 wt% at different flow rate. (a) Q_{Oil} = 7 µ L/min, Q_{XG} = 3 µL/min. (b) Q_{Oil} = 9 µL/min, Q_{XG} = 4 µL/min, (c) Q_{Oil} = 12 µL/min, Q_{XG} = 5 µL/min.

S6. Ordering in the long channel using XG 0.6 wt% at different pressure drops.

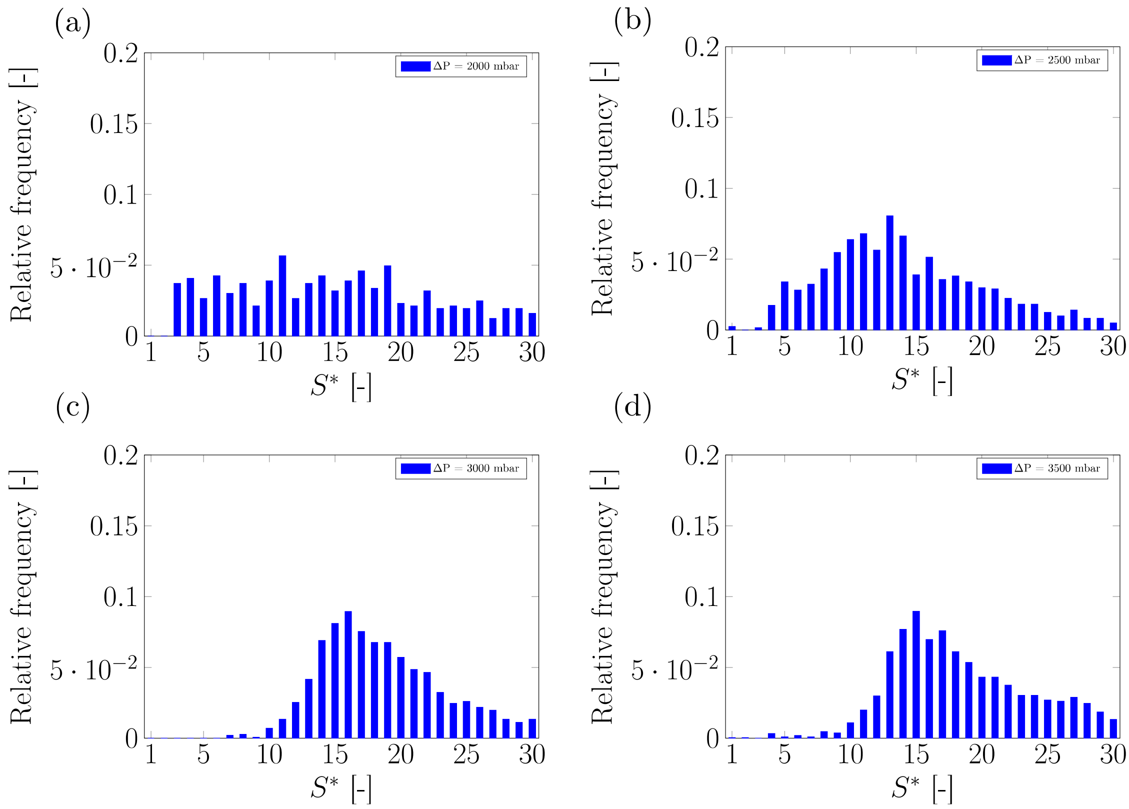

Figure S6: Ordering in the long channel using XG 0.6 wt% at different pressure drops. Histogram of normalised inter-particle spacing, $S^* = S/d$. Oil flow rate Q_{oil} = 12 µL/min and XG flow affected by pressure drop (ΔP): (a) 2000 mbar (b) 2500 mbar (c) 3000 mbar (d) 3500 mbar.