APPENDICES

Appendix A Relaxation Experiments

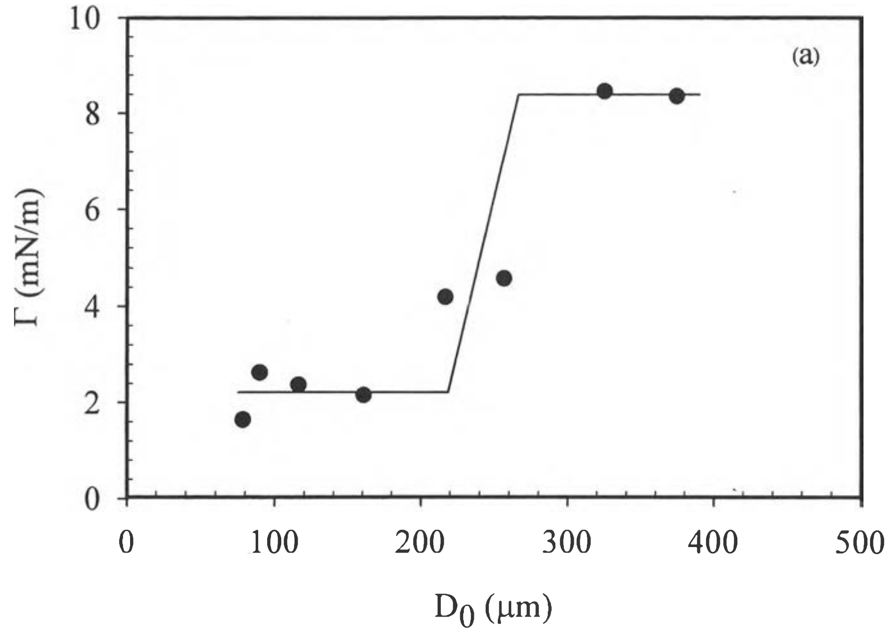
The sample was inserted between the two glass surfaces of the flow cell, whose roles were to maintain a constant specimen thickness and to ascertain that the imposed shear deformation was uniaxial. The sample was heated to the temperature chosen for the measurement. The desired strain was imposed onto a selected drop which moved the droplet out of the viewing window. The droplet then was allowed to completely relax into a spherical shape during a period of at least 60 min, and then the droplet was subjected to the same strain in the opposite direction in order to bring the droplet back into the viewing window. Observation of retraction of the ellipsoidal droplet was carried out by using an optical microscopic at a magnification depending on the drop-size. Around 100 to 200 images were record (10-20 second/frame). The deformation parameter, Def*, of a retracting droplet vs. time was measured; it is known to decay exponentially [Luicinia et al. (1997)] from the proposed equation.

$$\mathrm{Def}^* = \mathrm{Def}^*_0 \exp\,[-t/\tau] \qquad \text{(A.1)}$$

The slope of Def* vs. t on a semi-log plot can be related to the characteristic relaxation time for a single drop, τ, and the interfacial tension calculated from the following relation;

$$\tau = \frac{(3 + 2\eta_r)(16 + 19\eta_r)r_o \eta_{m,o}}{40(1 + \eta_r)\Gamma} \qquad \text{(A.2)}$$

To study the effect of droplet size on interfacial tension, the droplet size was varied from 70 μm to 400 μm at the fixed strain of 2 strain units and the effect of strain on the interfacial tension was then studied by varying strain from 1-8% with the fixed size of droplet at 370 ± (10μm).



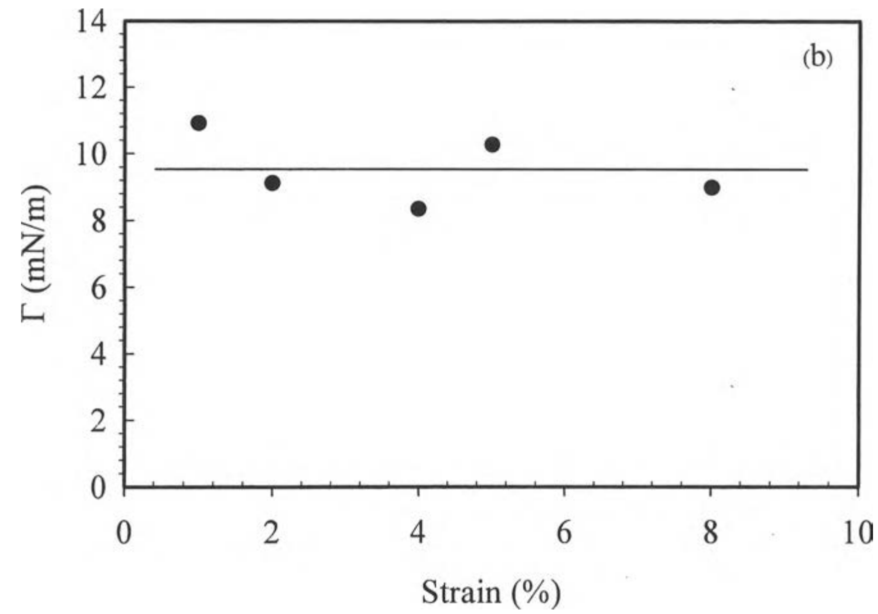


Figure A1 Dependence of the interfacial tension for system A: (a) on the applied initial droplet size (initial droplet size 78.4 μm - 386.5 μm at shear rate of 1 s^{-1} and fixed strain of 2 %); (b) on the applied strain (initial droplet size around 370 ± (10) μm at shear rate of 1 s^{-1}) Γ_{Theory} = 5.84 mN/m ref. Branrup, and E. H. Imergut, Polymer Handbook, 3rd Ed., New York (1989)., $\Gamma_{calculated}$ = 9.60 mN/m.

Raw Data in Relaxation Time Experiments

Table A1 Interfacial tension of system A (PS1/HDPE at 143^{O}C) Γ_{Theory}= 5.7 mN/m at 150 ^{o}C, $d\Gamma/dT$ = 0.020 mN/m-K, η_d=5,600 Pa.s, η_m= 2,250 Pa.s, $\eta_r \approx 2.5$, $N_{1,d}$ = 6,627 Pa, $N_{1,m}$ = 1,995 Pa, $N_{1,r}$ = 3.30

Test	Initial Drop Diameter (μm)	Gap (μm)	Shear Rate (S^{-1})	Strain (%)	Relaxation time (τ)	Γ (mN/m)
1	362.6	2000	1.0	1	377.78	10.92
2	362.6	2000	1.0	4	493.93	8.35
3	373.0	2000	1.0	5	412.55	10.28
4	373.0	2000	1.0	8	472.07	8.99
5	78.4	2100	1.0	2	540.13	1.65
6	89.6	2100	1.0	2	386.85	2.63
7	116.0	2100	1.0	2	556.72	2.37
8	160.0	2000	1.0	2	843.82	2.16
9	216.5	2000	1.0	2	585.88	4.20
10	256.4	2100	1.0	2	636.31	4.58
11	325.0	2100	1.0	2	436.98	8.46
12	374.6	2000	1.0	2	509.50	8.36

Appendix B Transient Deformation Experiments

The matrix phase was loaded into the flow cell and various single droplets were subsequently immersed into the matrix. The deformed shapes of the droplets were observed as a function of time from initial to attain steady-state shapes, Because of the limitation of flow cell device, a single droplet can not be imaged from the startup of shearing until attaining steady-state shape. Therefore the deformed shapes of isolated droplet could be determined by combining the results of several experiments. In the experiment of type 1, the droplet moved out of viewing window through imposing low strain of less than 40 strain units (≈ 1 orbit) on the droplet. The droplet was left to relax its shape at least 60 minutes. Then the isolated droplet was imposed by the same strain but in the opposite direction which moved the droplet back into the viewing window, where we could image its deformation. However, the droplet could not be observed for large strain as it would move out of the viewing window. To obtain deformation of droplet at large strains, in the experiment of type 2, the droplet was imposed with a shearing flow continuously and images of the droplet were taken when the droplet passed through the viewing window. To clearly obtain droplet images, we stopped the flow each time the droplet reached the viewing window for a period of less than 1 second; this duration was relatively short for droplet to relax its shape by a significant amount. The time for one cycle of a droplet was recorded with a stopwatch along with the time shown on the Linksys program, and then the flow was imposed again until the droplet passed through the viewing window again. By repeating the experiment on droplets which were stopped at different times, we could assemble a consistent curve of deformation from the initial time to the time in which droplets attained steady-state shape. Transient experiments were achieved by varying the capillary number, Ca, from 5, 8, to 11 through varying droplet size at the same shear rate of 0.4 s^{-1}. To separate the effect of viscous force from the effect of elasticity, other experiments were carried out by keeping capillary number fixed at 8 and the elastic forces were varied by changing the shear rate from 0.10, 0.17, 0.40 to 0.63 s^{-1} and while using the droplet sizes of 289.7, 177, 85 and 56 μm, respectively. Transient experiments for system B were carried out by keeping capillary number at 8 at the shear rate of 0.63 s^{-1}.

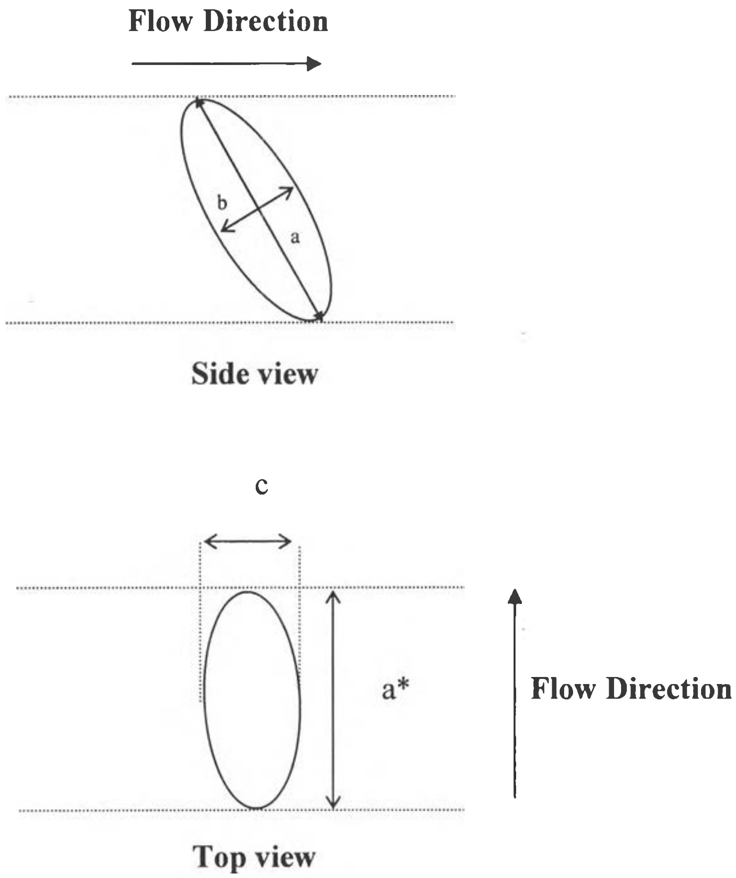


Figure B1 Schematic drawing of a single drop observed from the side and top views of the optical microscope; a and b are the long and short axes of the droplet in the flow-gradient plane, a* is the a axis projected into the flow direction, and c is the principal axis in the radial direction.

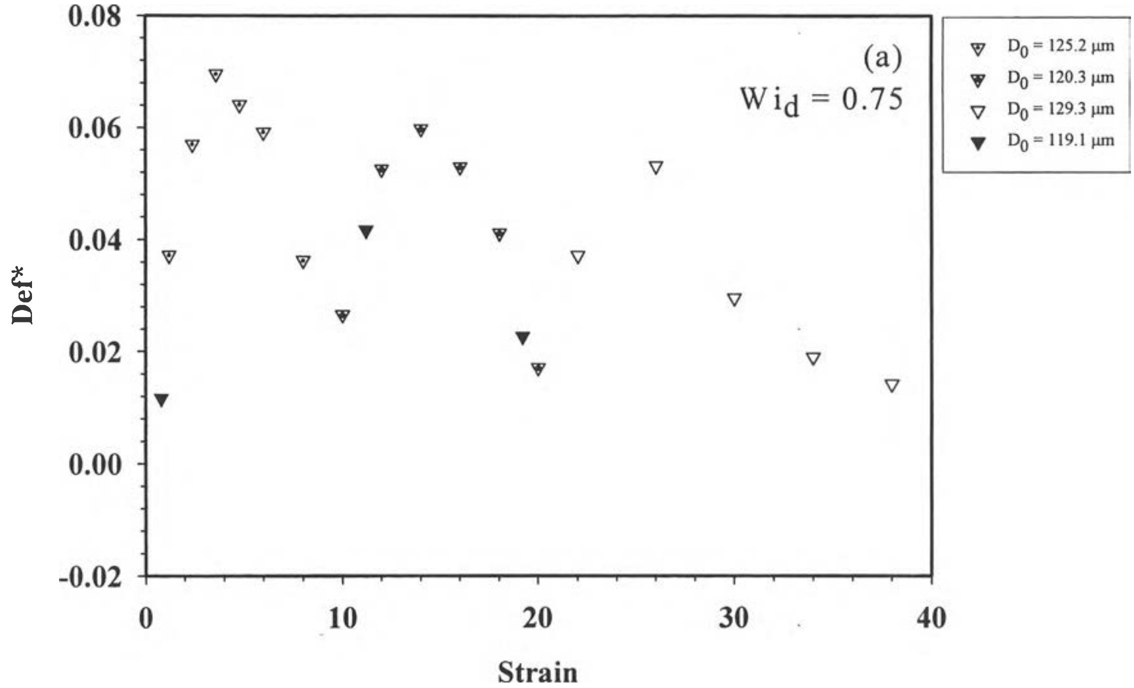


Figure B2a Time-dependent droplet deformation of system A of less than 40 strain units at Ca = 11, at shear rate 0.4 s^{-1}, and Wi_d = 0.75.

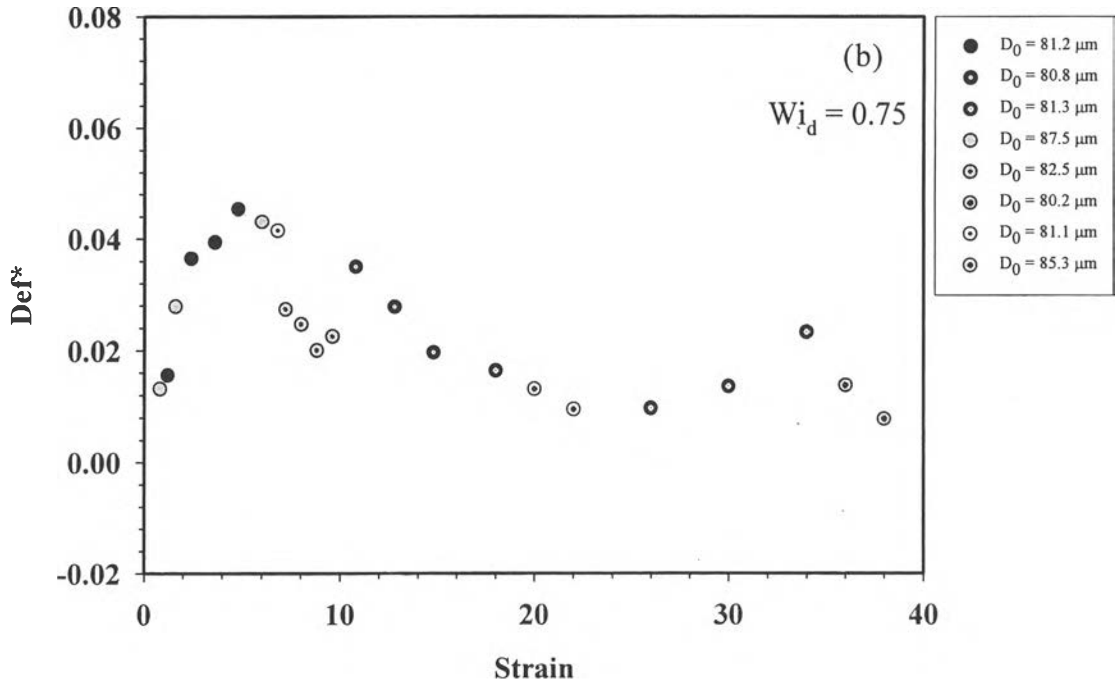


Figure B2b Time-dependent droplet deformation of system A of less than 40 strain units at Ca = 8, at shear rate 0.4 s^{-1}, and Wi_d = 0.75.

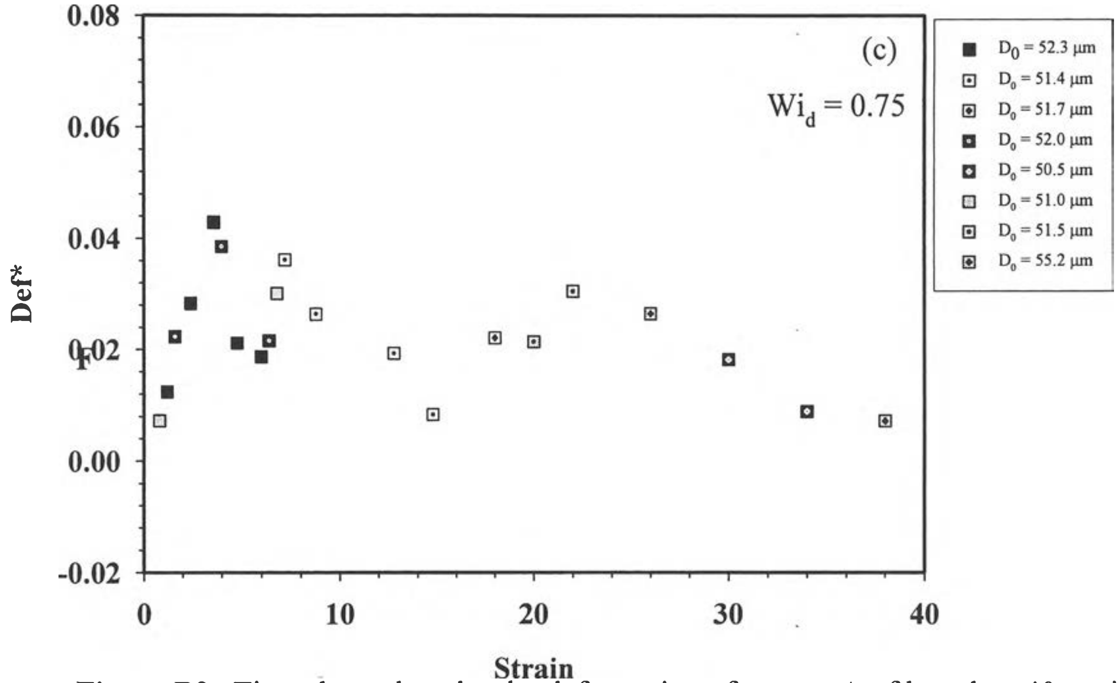


Figure B2c Time-dependent droplet deformation of system A of less than 40 strain units at Ca = 5, at shear rate 0.4 s^{-1}, and Wi_d = 0.75.

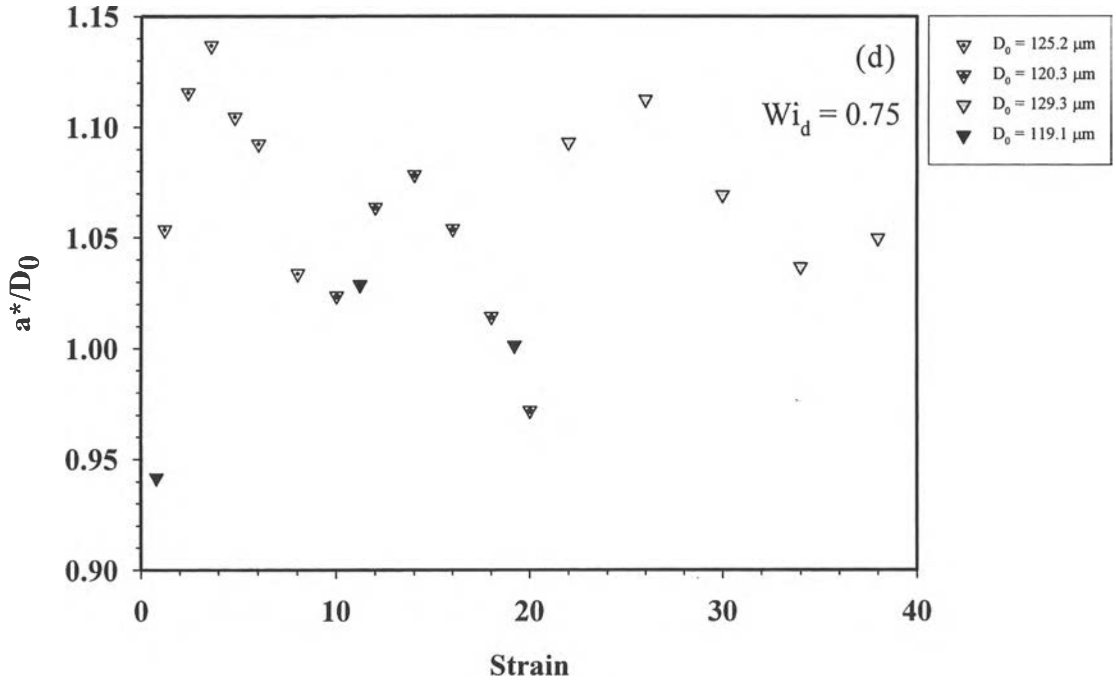


Figure B2d Time-dependent a^*/D_0 of system A of less than 40 strain units at Ca = 11, at shear rate 0.4 s^{-1}, and Wi_d = 0.75.

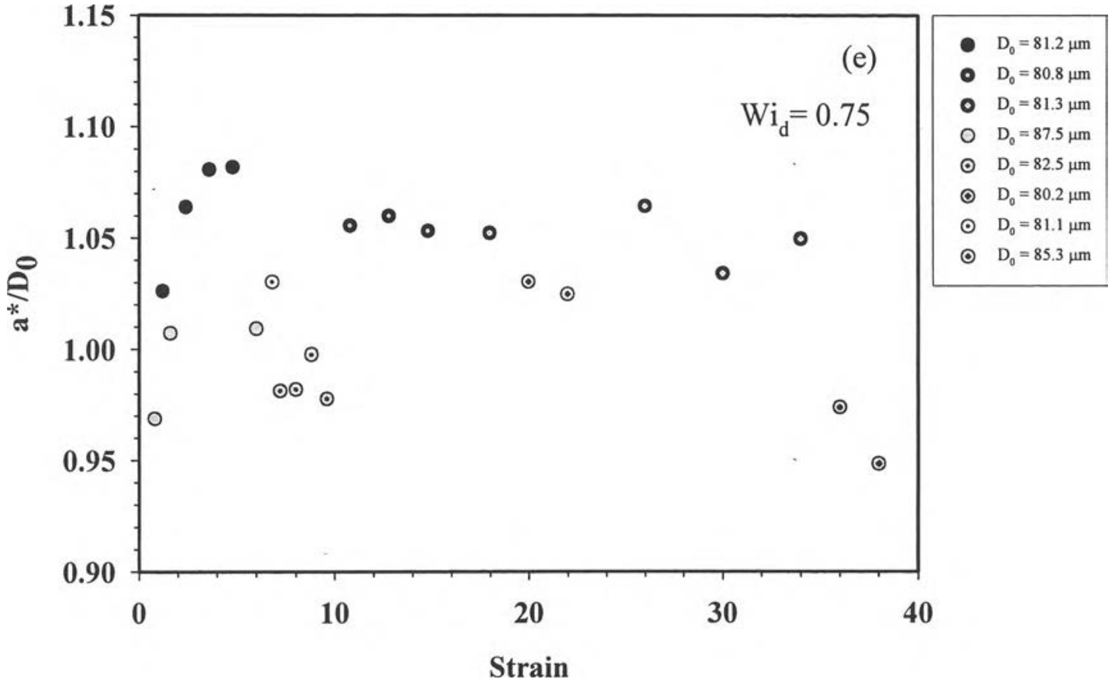


Figure B2e Time-dependent a*/ D_0 of system A of less than 40 strain units at Ca = 8, at shear rate 0.4 s^{-1}, and $Wi_d = 0.75$.

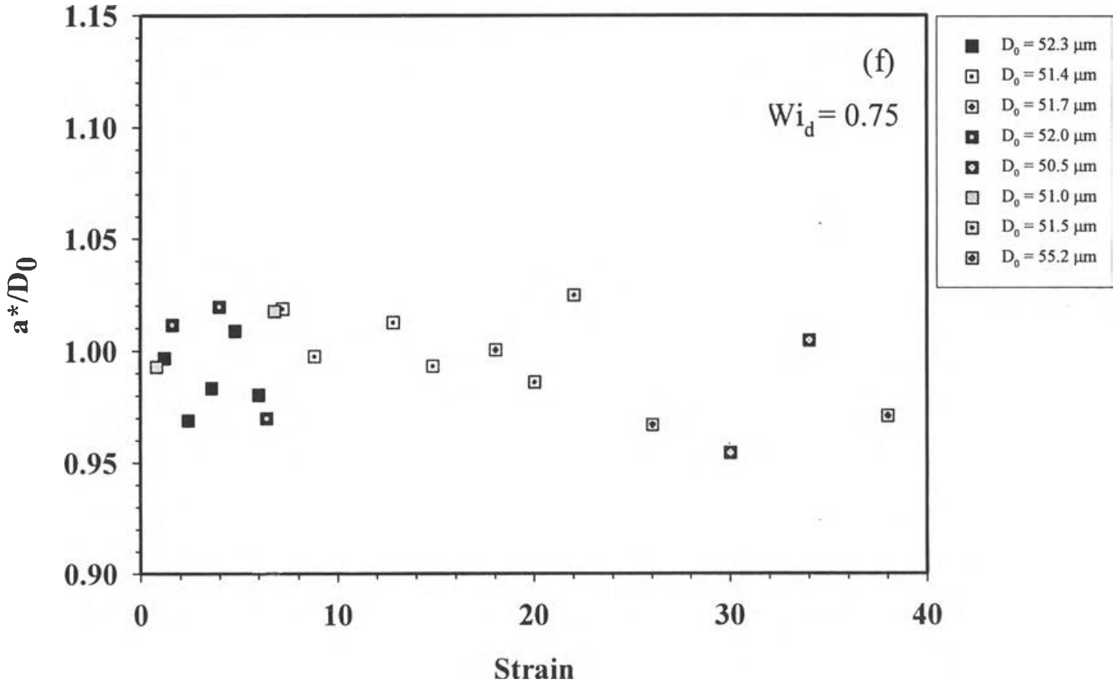


Figure B2f Time-dependent a*/D_0 of system A of less than 40 strain units of Ca = 5, at shear rate 0.4 s^{-1}, and $Wi_d = 0.75$.

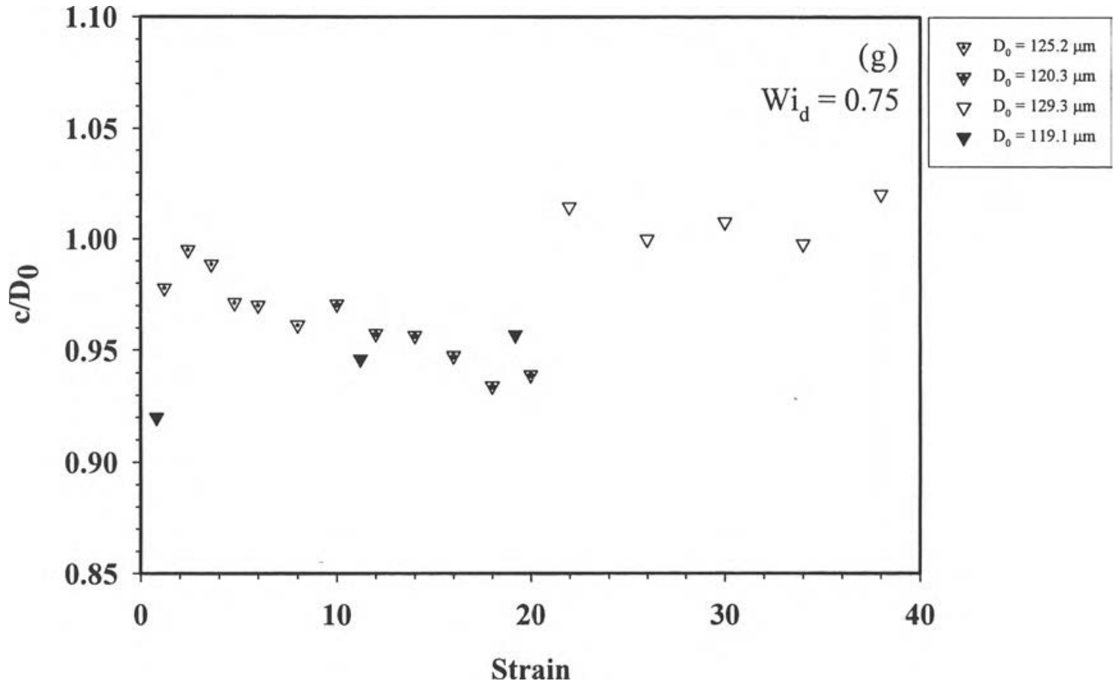


Figure B2g Time-dependent c/D_0 of system A of less than 40 strain units of Ca = 11, at shear rate 0.4 s^{-1}, and Wi_d = 0.75.

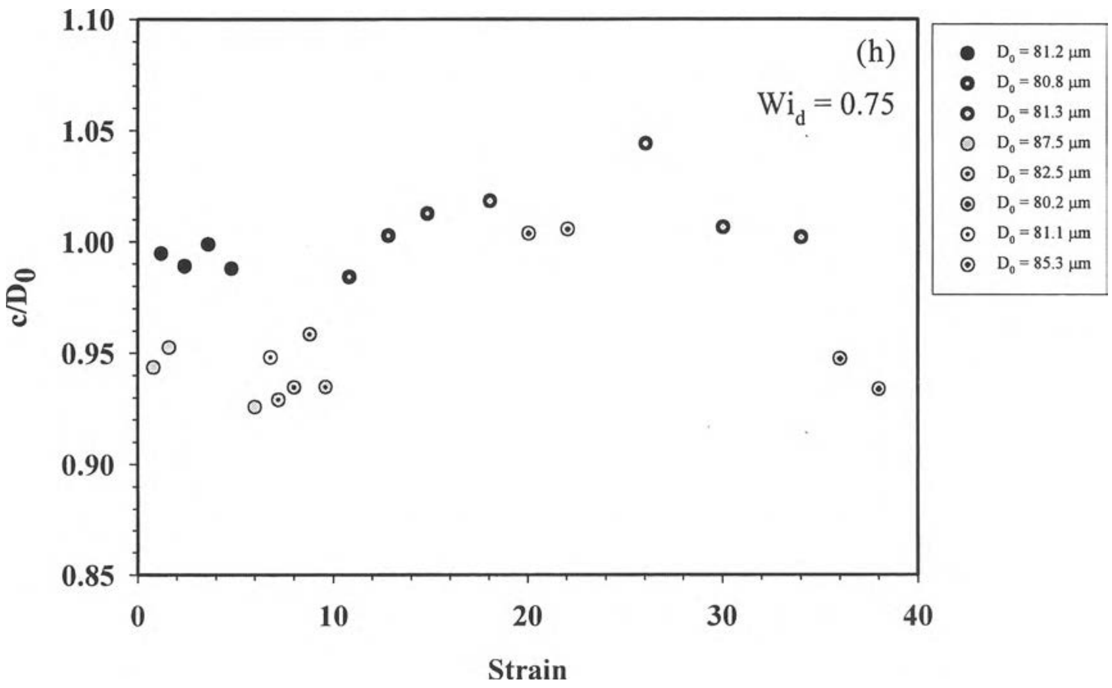


Figure B2h Time-dependent c/D_0 of system A of less than 40 strain units of Ca = 8, at shear rate 0.4 s^{-1}, and Wi_d = 0.75.

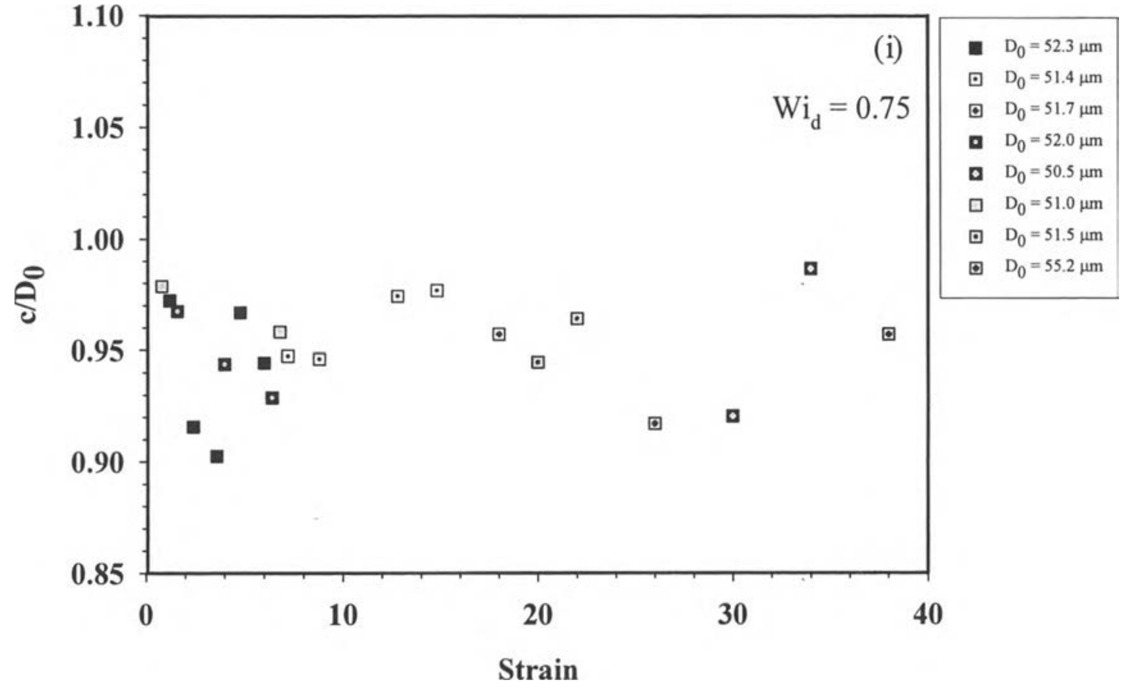


Figure B2i Time-dependent c/D_0 of system A of less than 40 strain units of Ca = 5, at shear rate 0.4 s^{-1}, and Wi_d = 0.75.

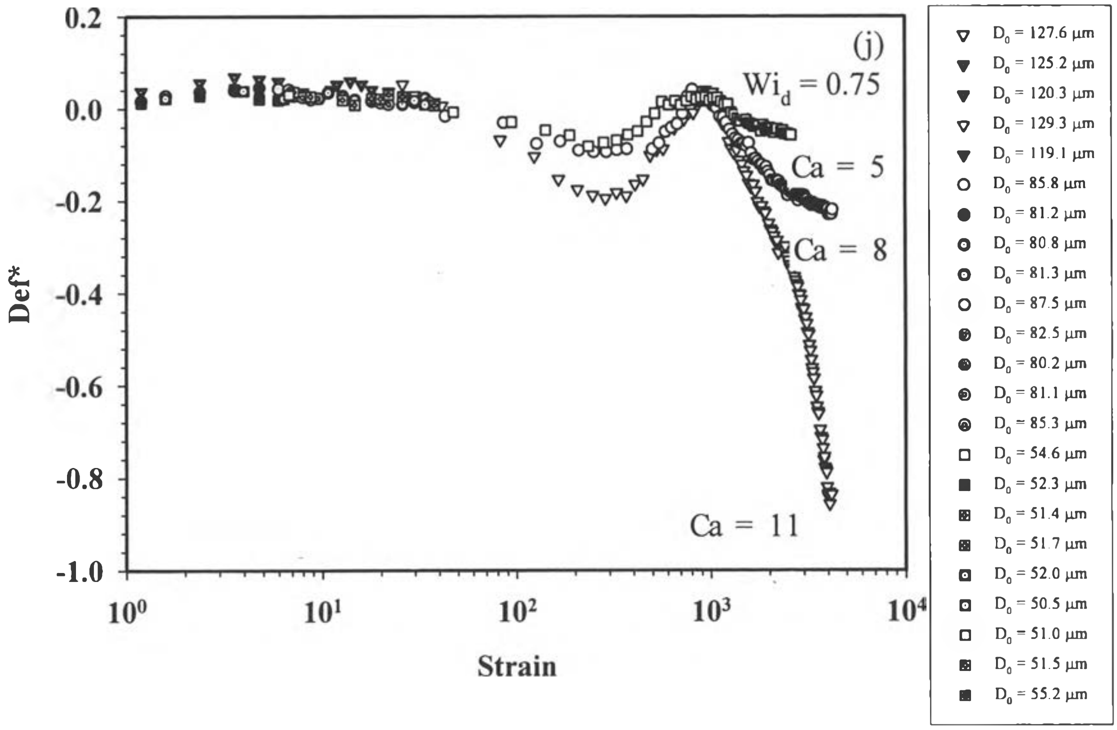


Figure B2j Time-dependent droplet deformation of system A at varios values of Ca, (11, 8, and 5), at the same shear rate 0.4 s^{-1}, and $Wi_d = 0.75$.

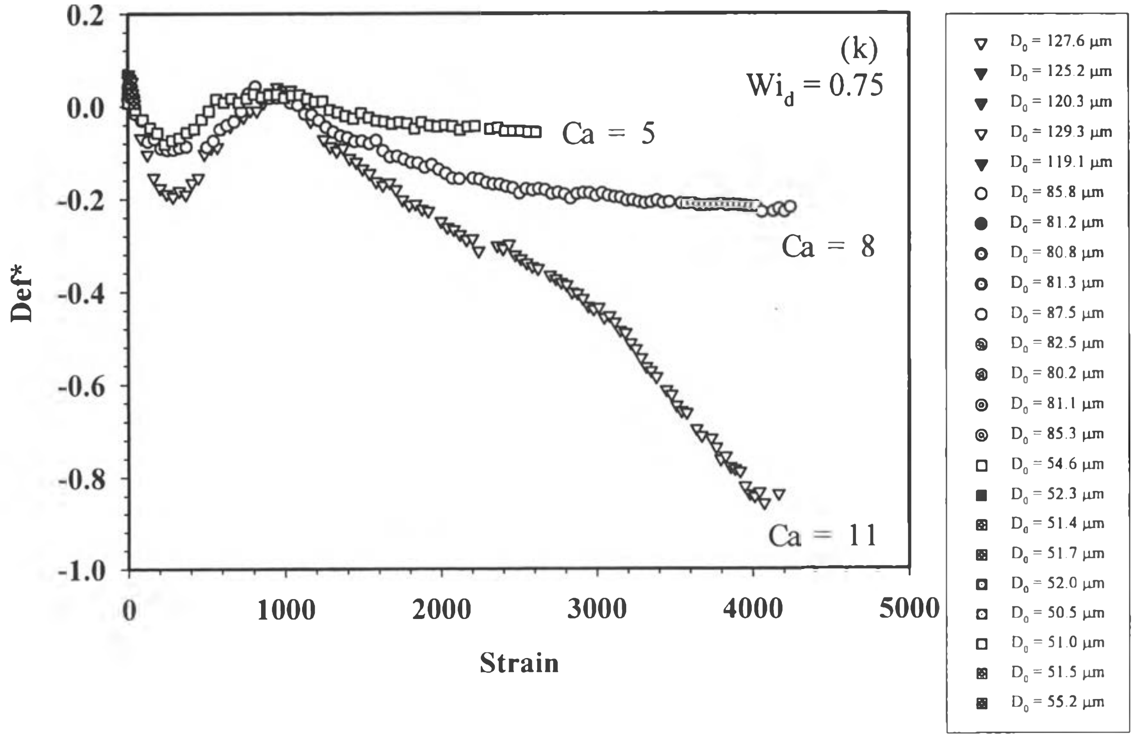


Figure B2k Time-dependent droplet deformation of system A at varios values of Ca (11, 8, and 5), at the same shear rate 0.4 s^{-1}, and $Wi_d = 0.75$.

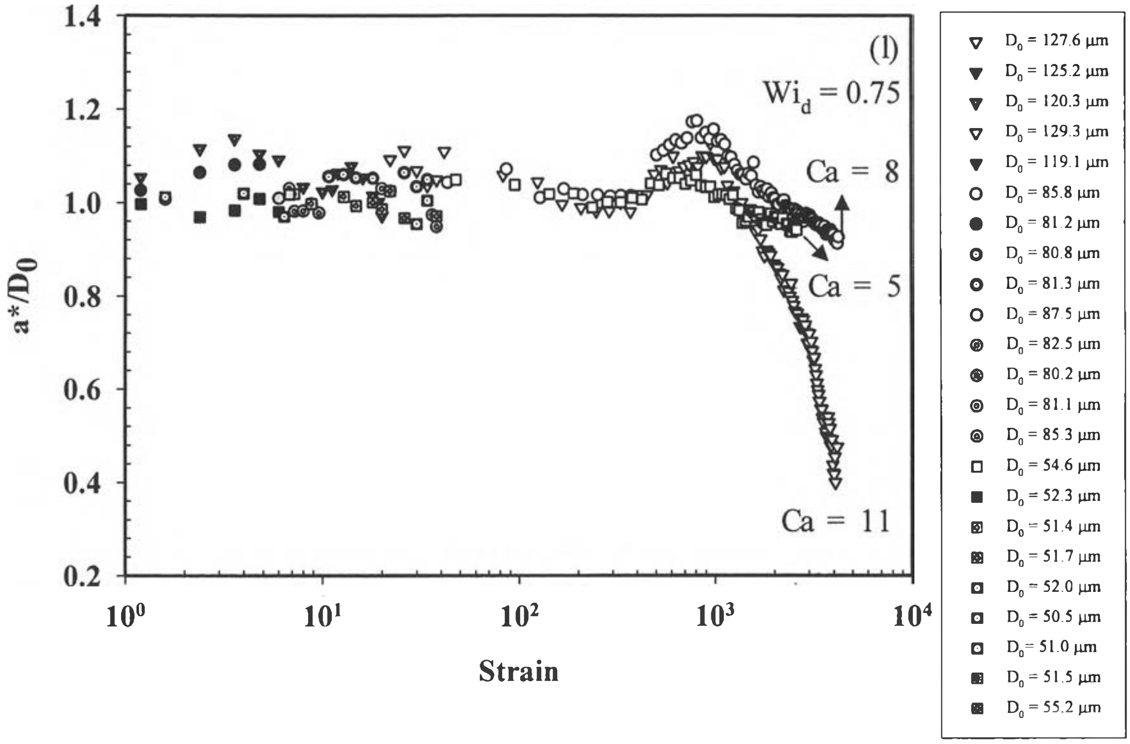


Figure B2l Time-dependent a*/D_0 of system A at varios values of Ca (11, 8, and 5) at the same shear rate 0.4 s^{-1}, and Wi_d = 0.75 on a log time scale.

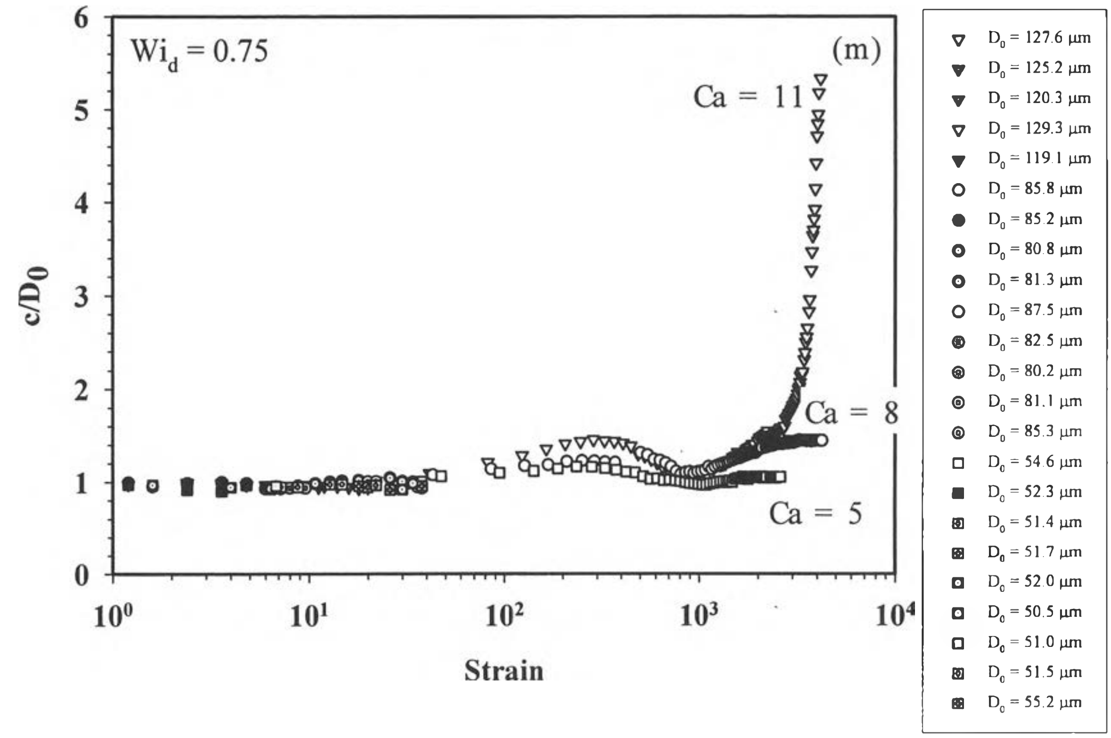


Figure B2m Time-dependent c/D_0 of system A at varios values of Ca (11, 8, and 5) at the same shear rate 0.4 s^{-1}, and Wi_d = 0.75 on a log time scale.

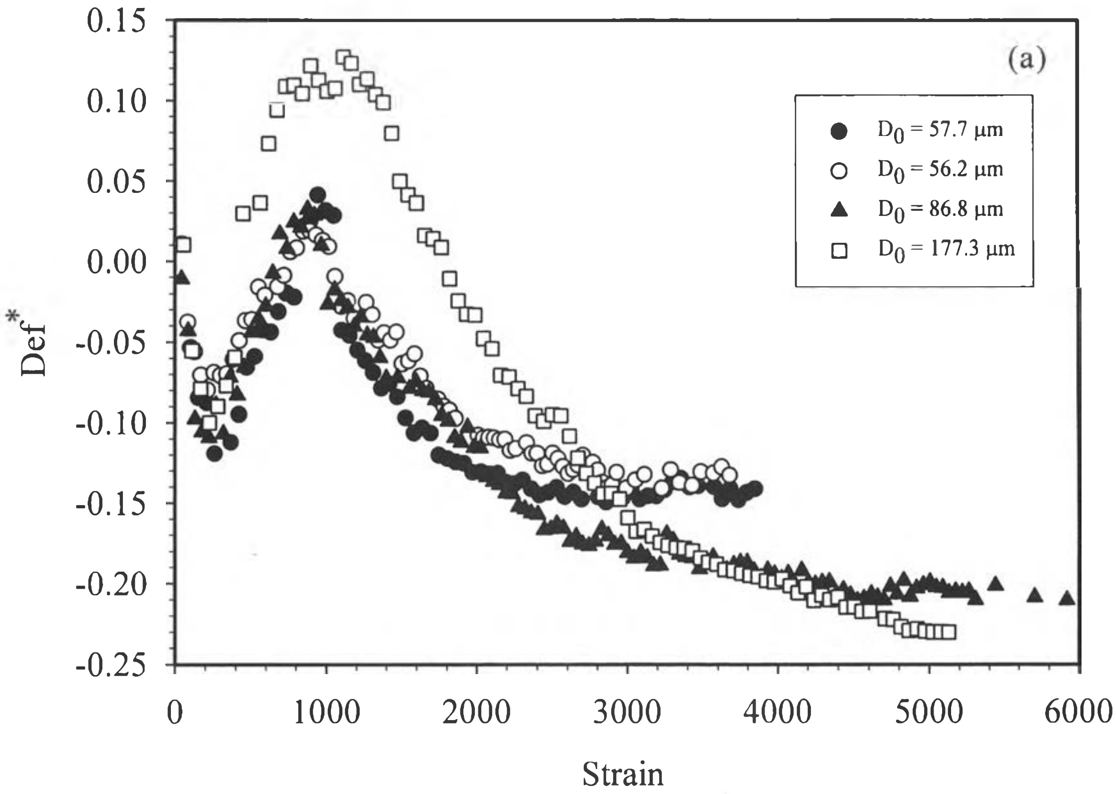


Figure B3a Strain dependent droplet deformation of system A at different shear rates, Ca = 8: $\dot{\gamma}$ = 0.17 s^{-1}, Wi_d = 0.45, (□); $\dot{\gamma}$ = 0.40 s^{-1}, Wi_d = 0.75, (▲); $\dot{\gamma}$ = 0.63 s^{-1}, Wi_d = 0.99, (●), (○).

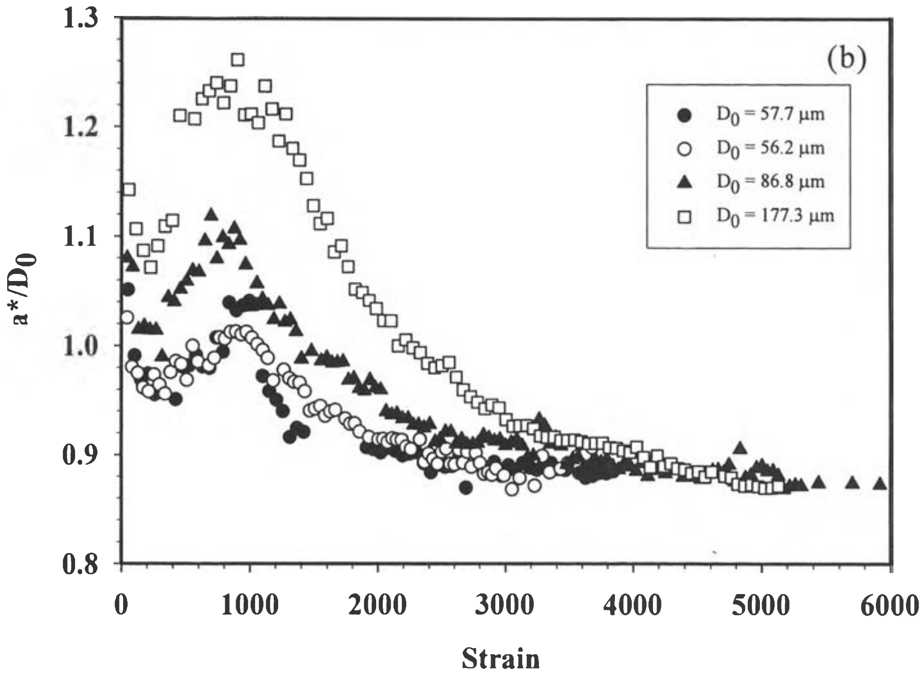


Figure B3b Strain dependent a*/D_0 of system A at different shear rates, Ca = 8: $\dot{\gamma}$ = 0.17 s^{-1}, Wi_d = 0.45, (□); $\dot{\gamma}$ = 0.40 s^{-1}, Wi_d = 0.75, (▲); $\dot{\gamma}$ = 0.63 s^{-1}, Wi_d = 0.99, (●), (○).

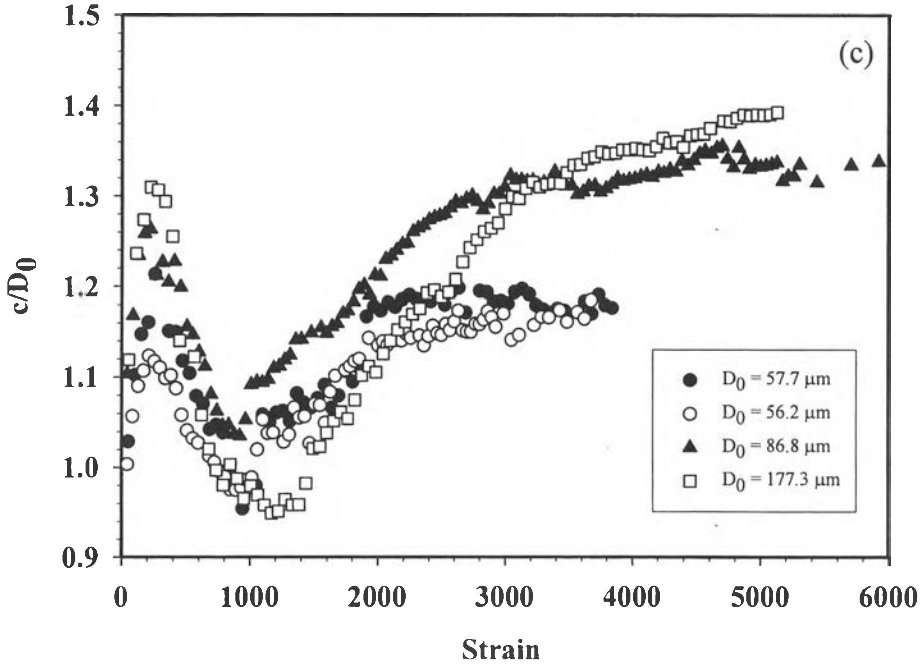


Figure B3c Strain dependent c/D_0 of system A at different shear rates, Ca = 8: $\dot{\gamma}$ = 0.17 s^{-1}, Wi_d = 0.45, (□); $\dot{\gamma}$ = 0.40 s^{-1}, Wi_d = 0.75, (▲); $\dot{\gamma}$ = 0.63 s^{-1}, Wi_d = 0.99, (●), (○).

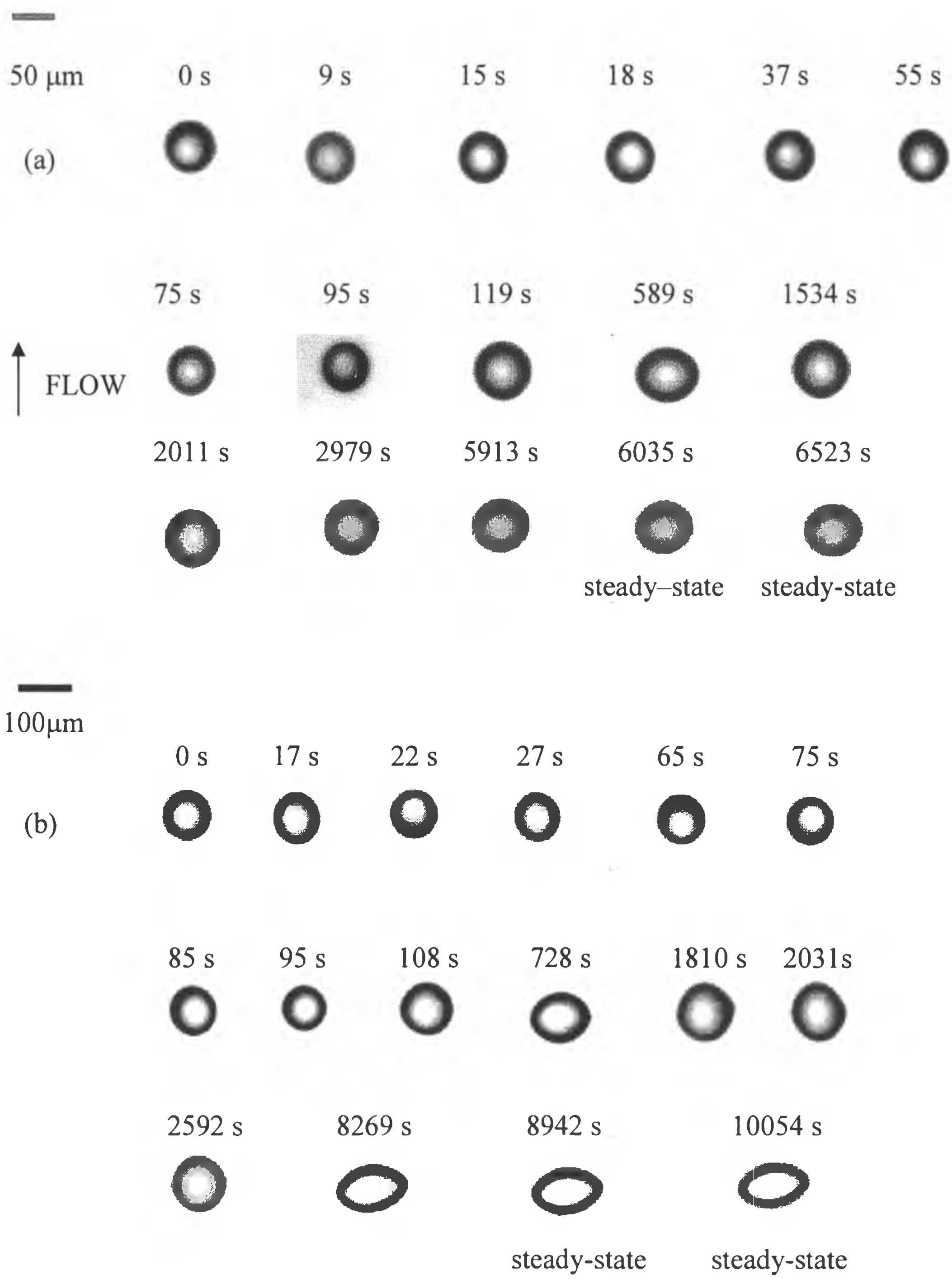


Figure B4 Sequence of images of deformed droplets of system A after startup of a steady shear at a rate of 0.4 s^{-1}, $Wi_d = 0.75$, for $\eta_r = 2.6$; (a) images of Ca = 5, (b) Ca = 8.

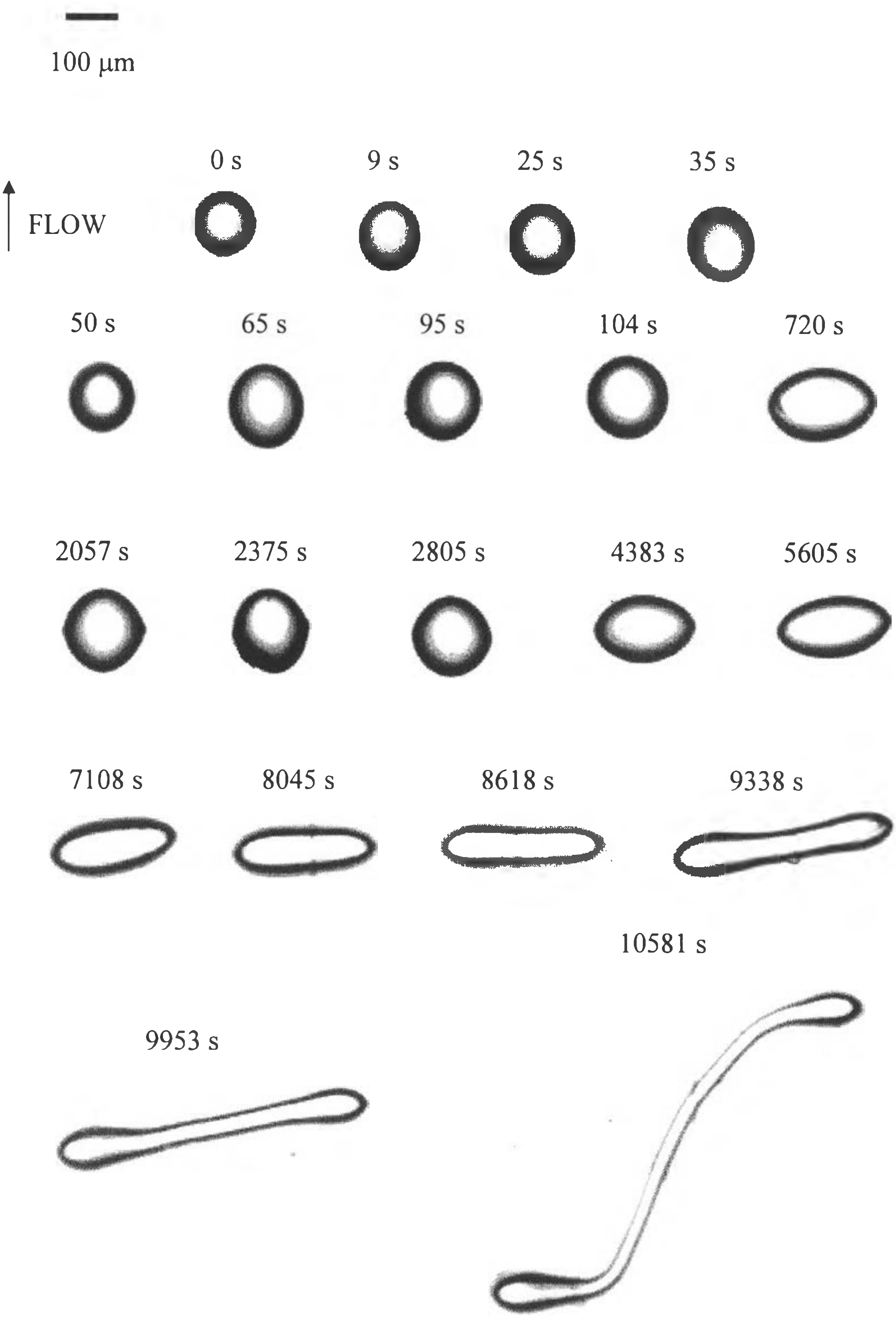


Figure B5 Sequence of images during droplet breakup of system Aat a shear rate of 0.4 s^{-1} ,Wi_d = 0.75 for η_r = 2.6, Ca = 11.

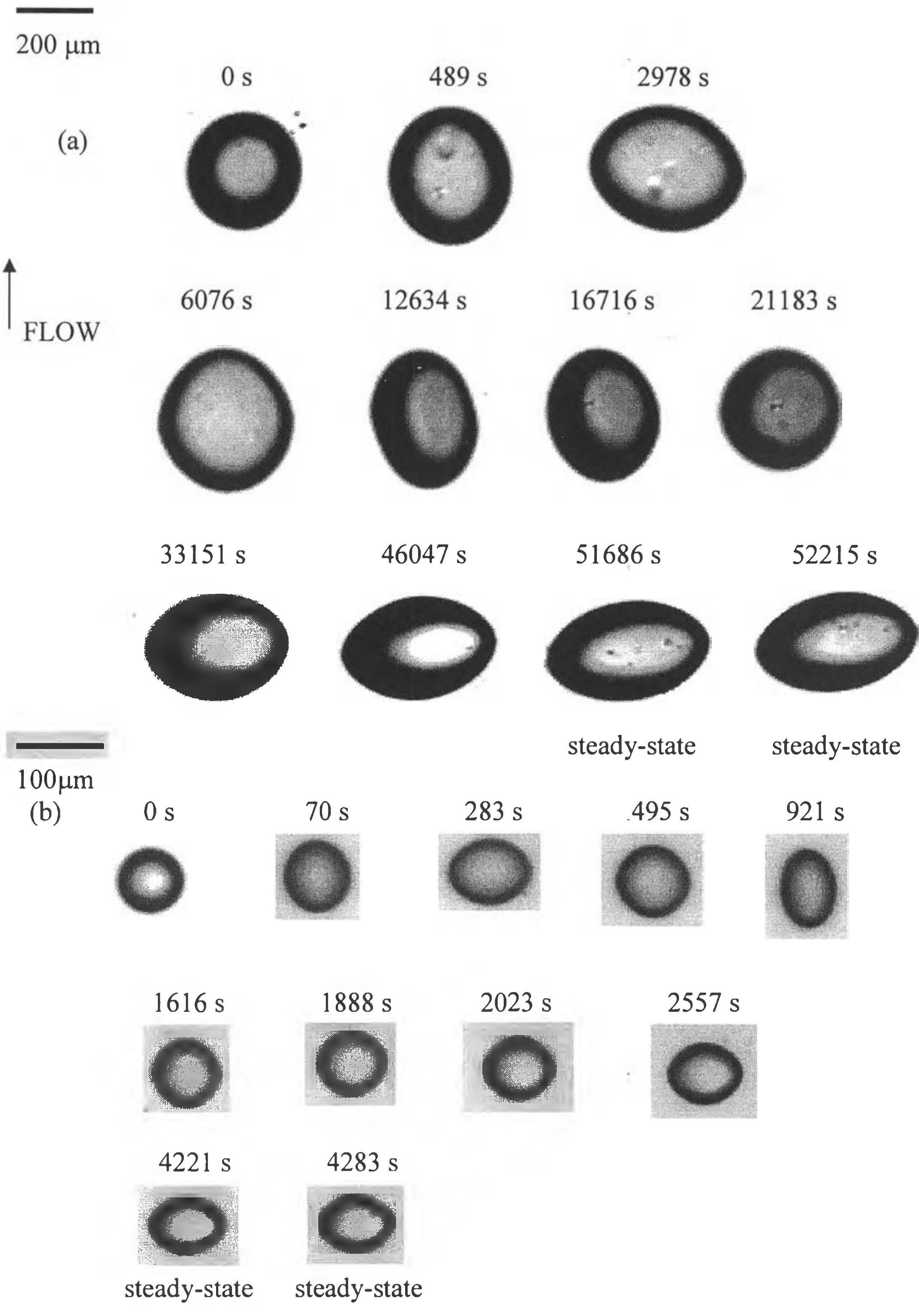


Figure B6 Sequence of images of deformed droplets after startup of a steady shear $Wi_d \approx 0.30$, Ca = 8: (a) system A, $\eta_r = 2.6$ at a rate of 0.1 s^{-1}, $D_0 = 289.7$ μm ; (b) system B, $\eta_r = 0.5$ at a rate of 0.63 s^{-1}, $D_0 = 72.2$ μm.

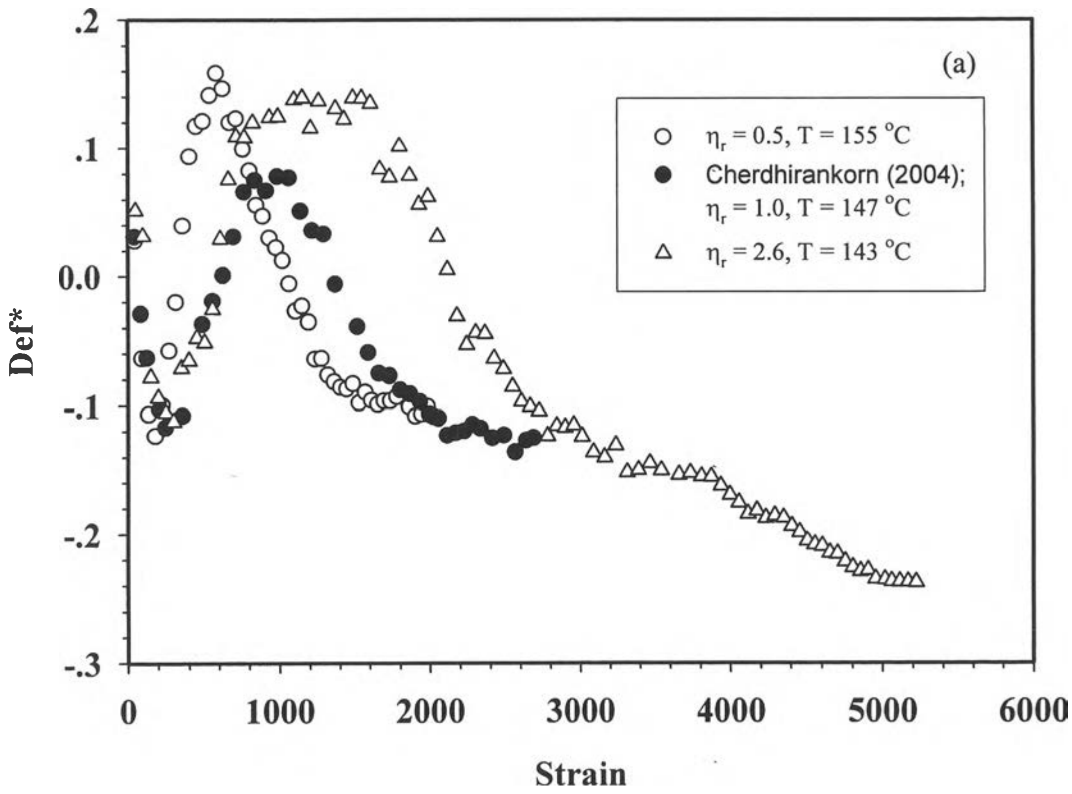


Figure B7a Dependence of the Def* on applied strain at various viscosity ratios, η_r, Ca =8 and $Wi_d \approx 0.30$: $\eta_r = 0.5$, $\dot{\gamma} = 0.63\ s^{-1}$, (○); $\eta_r = 1.0$, $\dot{\gamma} = 0.50\ s^{-1}$, (●); $\eta_r = 2.6$, $\dot{\gamma} = 0.10\ s^{-1}$, (△).

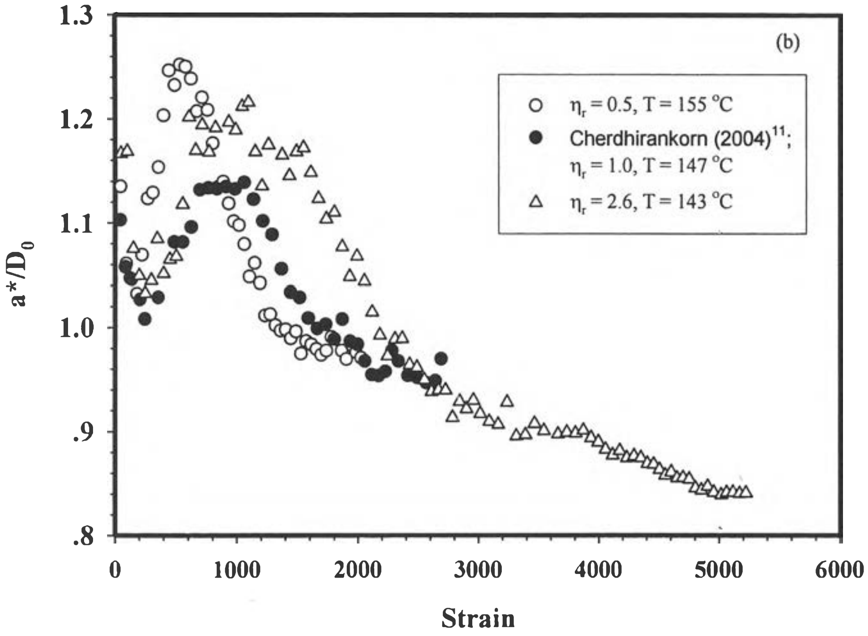


Figure B7b Dependence of the a*/D_0 on applied strain at various viscosity ratios, η_r, Ca =8 and $Wi_d \approx 0.30$: $\eta_r = 0.5$, $\dot{\gamma} = 0.63$ s^{-1}, (○); $\eta_r = 1.0$, $\dot{\gamma} = 0.50$ s^{-1}, (●); η_r = 2.6, $\dot{\gamma} = 0.40$ s^{-1}, (△).

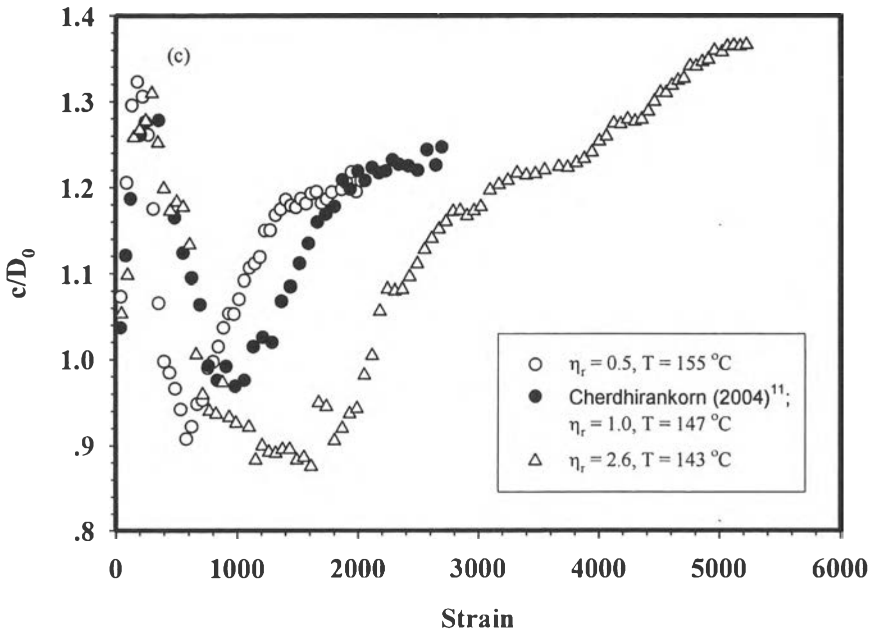


Figure B7c Dependence of the c/D_0 on applied strain at various viscosity ratios, η_r,Ca =8 and $W_d \approx 0.30$: $\eta_r = 0.5$, $\dot{\gamma} = 0.63$ s^{-1}, (○); $\eta_r = 1.0$, $\dot{\gamma} = 0.50$ s^{-1}, (●); η_r = 2.6, $\dot{\gamma} = 0.40$ s^{-1}, (△).

Raw Data in Transient Experiments

Table B1 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.4 s^{-1}, Wi_d = 0.75, Wi_m = 0.71, D_0 ≈ 85 (±5) μm, η_d = 6,880 Pa.s, η_m = 2,580 Pa.s, η_r ≈ 2.6, $N_{1,d}$ = 2,080 Pa, $N_{1,m}$ = 733 Pa, $N_{1,r}$ = 2.83, Ca ≈ 8.0, Γ = 5.84 mN/m)

Test	Gap (μm)	Do (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/ Do	c/ Do
1	1550	81.2	3	1.2	83.33	80.77	0.0156	1.0262	0.9947
			6	2.4	86.40	80.31	0.0365	1.0640	0.9890
			9	3.6	87.76	81.11	0.0394	1.0808	0.9989
			12	4.8	87.85	80.22	0.0454	1.0819	0.9879
2	1800	80.8	27	10.8	85.30	79.53	0.0350	0.9816	0.9152
			32	12.8	85.65	81.02	0.0278	0.9856	0.9323
			37	14.8	85.10	81.82	0.0197	0.9793	0.9415
3	1850	81.3	45	18.0	85.55	82.79	0.0164	1.0029	0.9469
			65	26.0	86.54	84.88	0.0097	1.0145	0.9415
			75	30.0	84.08	81.83	0.0136	0.9857	0.9509
			85	34.0	85.34	81.46	0.0233	1.0005	0.9404
4	1870	87.5	2	0.8	84.77	82.57	0.0131	0.9938	0.9324
			4	1.6	88.13	83.35	0.0279	1.0332	0.9498
			15	6.0	88.31	81.01	0.0431	1.0353	0.9592
5	1730	82.5	18	7.2	80.96	76.65	0.0273	0.9491	0.9706
			20	8.0	81.01	77.11	0.0247	0.9497	0.9951
			22	8.8	82.31	79.08	0.0200	0.9649	0.9593
			24	9.6	80.67	77.12	0.0225	0.9457	0.9550
6	1860	80.2	90	36.0	78.11	75.99	0.0138	0.9157	0.9680
			95	38.0	76.07	74.90	0.0077	0.8918	0.9771
7	1900	81.1	17	6.8	83.56	76.90	0.0415	0.9796	0.9497
8	1980	85.3	50	20.0	87.89	85.62	0.0131	1.0304	0.8986
			55	22.0	87.42	85.78	0.0095	1.0249	0.9040

Table B1 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.4 s^{-1}, Wi_d = 0.75, Wi_m = 0.71, $D_0 \approx 85$ (±5) μm, η_d = 6,880 Pa.s, η_m = 2,580 Pa.s, $\eta_r \approx 2.6$, $N_{1,d}$ = 2,080 Pa, $N_{1,m}$ = 733 Pa, $N_{1,r}$ = 2.83, Ca ≈ 8.0, Γ = 5.84 mN/m) (Cont.)

Test	Gap (μm)	Do (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/ Do	c/ Do
9	2060	85.8	108	43.2	89.55	92.43	-0.0158	1.0437	1.0773
			215	86.0	91.94	97.69	-0.0303	1.0716	1.1386
			319	127.6	86.72	100.96	-0.0759	1.0107	1.1767
			422	168.8	88.30	101.72	-0.0706	1.0291	1.1855
			526	210.4	87.23	104.61	-0.0906	1.0167	1.2192
			628	251.2	87.21	105.31	-0.0940	1.0164	1.2274
			728	291.2	86.95	104.94	-0.0938	1.0134	1.2231
			826	330.4	87.09	104.23	-0.0896	1.0150	1.2148
			930	372.0	87.07	103.70	-0.0872	1.0148	1.2086
			1038	415.2	89.15	113.74	-0.1212	1.0390	1.3256
			1260	504.0	94.52	112.84	-0.0883	1.1016	1.3152
			1369	547.6	95.38	110.70	-0.0743	1.1117	1.2902
			1477	590.8	96.35	106.48	-0.0499	1.1230	1.2410
			1586	634.4	97.29	105.58	-0.0409	1.1339	1.2305
			1697	678.8	96.71	103.37	-0.0333	1.1272	1.2048
			1810	724.0	97.66	99.80	-0.0108	1.1382	1.1632
			1921	768.4	100.59	95.34	0.0268	1.1724	1.1112
			2031	812.4	100.79	92.79	0.0413	1.1747	1.0815
			2142	856.8	97.73	94.60	0.0163	1.1390	1.1026
			2253	901.2	98.62	95.31	0.0171	1.1494	1.1108
			2365	946.0	97.45	94.01	0.0180	1.1358	1.0957
			2478	991.2	99.22	95.10	0.0212	1.1564	1.1084
			2592	1036.8	97.02	95.65	0.0071	1.1308	1.1148
			2705	1082.0	97.28	96.87	0.0021	1.1338	1.1290

Table B1 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.4 s^{-1}, Wi_d = 0.75, Wi_m = 0.71, $D_0 \approx 85$ (±5) μm, η_d = 6,880 Pa.s, η_m = 2,580 Pa.s, $\eta_r \approx 2.6$, $N_{1,d}$ = 2,080 Pa, $N_{1,m}$ = 733 Pa, $N_{1,r}$ = 2.83, Ca ≈ 8.0, Γ = 5.84 mN/m) (Cont.)

Test	Gap (μm)	Do (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/ Do	c/ Do
9	2060	85.8	2819	1127.6	96.47	99.79	-0.0169	1.1244	1.1631
			2930	1172.0	94.34	97.86	-0.0183	1.0995	1.1406
			3044	1217.6	94.12	100.00	-0.0303	1.0970	1.1655
			3159	1263.6	92.72	101.51	-0.0453	1.0807	1.1831
			3274	1309.6	91.69	102.52	-0.0558	1.0686	1.1949
			3388	1355.2	90.96	103.34	-0.0637	1.0601	1.2044
			3503	1401.2	90.99	104.23	-0.0678	1.0605	1.2148
			3617	1446.8	90.14	104.95	-0.0759	1.0506	1.2232
			3732	1492.8	91.13	105.90	-0.0750	1.0621	1.2343
			3848	1539.2	90.68	106.68	-0.0811	1.0569	1.2434
			3958	1583.2	93.17	108.06	-0.0740	1.0859	1.2594
			4071	1628.4	88.99	107.91	-0.0961	1.0372	1.2577
			4184	1673.6	87.71	109.35	-0.1098	1.0223	1.2745
			4297	1718.8	88.69	110.16	-0.1080	1.0337	1.2839
			4407	1762.8	87.95	110.73	-0.1147	1.0251	1.2906
			4521	1808.4	87.50	111.66	-0.1213	1.0198	1.3014
			4631	1852.4	88.25	112.87	-0.1224	1.0286	1.3155
			4744	1897.6	86.86	113.31	-0.1321	1.0124	1.3206
			4857	1942.8	87.53	112.85	-0.1264	1.0202	1.3153
			4969	1987.6	86.69	114.21	-0.1370	1.0104	1.3311
			5079	2031.6	86.45	115.78	-0.1450	1.0076	1.3494
			5189	2075.6	85.46	116.98	-0.1557	0.9960	1.3634
			5298	2119.2	85.48	117.22	-0.1566	0.9963	1.3662
			5516	2206.4	86.11	117.90	-0.1558	1.0036	1.3741

Table B1 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.4 s^{-1}, Wi_d = 0.75, Wi_m = 0.71, $D_0 \approx 85$ (±5) μm, η_d = 6,880 Pa.s, η_m = 2,580 Pa.s, $\eta_r \approx 2.6$, $N_{1,d}$ = 2,080 Pa, $N_{1,m}$ = 733 Pa, $N_{1,r}$ = 2.83, Ca ≈ 8.0, Γ = 5.84 mN/m)(Cont.)

Test	Gap (μm)	Do (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/ Do	c/ Do
9	2060	85.8	5624	2249.6	86.24	118.55	-0.1578	1.0051	1.3817
			5732	2292.8	85.21	119.01	-0.1655	0.9931	1.3871
			5840	2336.0	85.00	119.44	-0.1685	0.9907	1.3921
			5946	2378.4	84.82	119.27	-0.1688	0.9886	1.3901
			6051	2420.4	84.50	120.00	-0.1736	0.9848	1.3986
			6156	2462.4	84.33	120.53	-0.1767	0.9829	1.4048
			6261	2504.4	82.78	121.05	-0.1878	0.9648	1.4108
			6365	2546.0	84.61	121.41	-0.1786	0.9861	1.4150
			6469	2587.6	83.91	121.14	-0.1816	0.9780	1.4119
			6572	2628.8	84.24	120.94	-0.1789	0.9818	1.4096
			6674	2669.6	83.77	120.76	-0.1809	0.9763	1.4075
			6776	2710.4	82.80	121.46	-0.1893	0.9650	1.4156
			6878	2751.2	83.50	121.73	-0.1863	0.9732	1.4188
			6980	2792.0	82.99	122.05	-0.1905	0.9672	1.4225
			7082	2832.8	82.30	123.21	-0.1991	0.9592	1.4360
			7183	2873.2	83.07	121.92	-0.1895	0.9682	1.4210
			7284	2913.6	83.79	122.30	-0.1869	0.9766	1.4254
			7384	2953.6	83.50	122.16	-0.1880	0.9732	1.4238
			7484	2993.6	83.04	122.98	-0.1939	0.9678	1.4333
			7583	3033.2	83.50	122.16	-0.1880	0.9732	1.4238
			7682	3072.8	83.07	122.92	-0.1935	0.9682	1.4326
			7781	3112.4	82.73	123.18	-0.1964	0.9642	1.4357
			7879	3151.6	82.65	123.34	-0.1975	0.9633	1.4375
			7977	3190.8	82.11	124.22	-0.2041	0.9570	1.4478

Table B1 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.4 s^{-1}, Wi_d = 0.75, Wi_m = 0.71, $D_0 \approx$ 85 (±5) μm, η_d = 6,880 Pa.s, η_m = 2,580 Pa.s, $\eta_r \approx$ 2.6, $N_{1,d}$ = 2,080 Pa, $N_{1,m}$ = 733 Pa, $N_{1,r}$ = 2.83, Ca ≈ 8.0, Γ = 5.84 mN/m) (Cont.)

Test	Gap (μm)	Do (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/ Do	c/ Do
9	2060	85.8	8075	3230.0	82.07	123.85	-0.2029	0.9565	1.4435
			8172	3268.8	81.77	124.45	-0.2070	0.9530	1.4505
			8269	3307.6	81.64	124.94	-0.2096	0.9515	1.4562
			8366	3346.4	81.89	124.85	-0.2078	0.9544	1.4551
			8464	3385.6	81.97	124.00	-0.2041	0.9554	1.4452
			8561	3424.4	81.62	124.82	-0.2093	0.9513	1.4548
			8658	3463.2	81.60	124.28	-0.2073	0.9510	1.4485
			8848	3539.2	80.88	123.90	-0.2101	0.9427	1.4441
			8942	3576.8	81.25	124.90	-0.2117	0.9470	1.4557
			9036	3614.4	81.40	124.43	-0.2091	0.9487	1.4502
			9129	3651.6	80.45	124.41	-0.2146	0.9376	1.4500
			9223	3689.2	79.94	123.86	-0.2155	0.9317	1.4436
			9316	3726.4	80.79	124.78	-0.2140	0.9416	1.4543
			9409	3763.6	80.09	123.57	-0.2135	0.9334	1.4402
			9502	3800.8	80.85	123.95	-0.2104	0.9423	1.4446
			9595	3838.0	80.13	124.16	-0.2155	0.9339	1.4471
			9687	3874.8	80.81	124.75	-0.2138	0.9418	1.4540
			9779	3911.6	80.36	124.25	-0.2145	0.9366	1.4481
			9871	3948.4	80.38	124.66	-0.2160	0.9368	1.4529
			9963	3985.2	79.89	124.39	-0.2178	0.9311	1.4498
			10054	4021.6	79.93	124.47	-0.2179	0.9316	1.4507
			10145	4058.0	78.91	125.93	-0.2295	0.9197	1.4677
			10327	4130.8	78.64	125.15	-0.2282	0.9166	1.4586
			10418	4167.2	79.10	124.26	-0.2221	0.9219	1.4483

Table B1 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.4 s^{-1}, Wi_d = 0.75, Wi_m = 0.71, $D_0 \approx 85$ (±5) μm, η_d = 6,880 Pa.s, η_m = 2,580 Pa.s, $\eta_r \approx 2.6$, $N_{1,d}$ = 2,080 Pa, $N_{1,m}$ = 733 Pa, $N_{1,r}$ = 2.83, Ca ≈ 8.0, Γ = 5.84 mN/m) (Cont.)

Test	Gap (μm)	Do (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/ Do	c/ Do
9	2060	85.8	10509	4203.6	78.31	124.76	-0.2287	0.9127	1.4541
			10600	4240.0	79.50	124.10	-0.2191	0.9266	1.4464
10	2080	86.8	109	43.6	93.75	95.80	-0.0108	1.0801	1.1037
			218	87.2	93.03	101.39	-0.0430	1.0718	1.1681
			329	131.6	88.07	107.11	-0.0976	1.0146	1.2340
			443	177.2	88.34	109.21	-0.1056	1.0177	1.2582
			557	222.8	88.06	109.65	-0.1092	1.0145	1.2632
			672	268.8	88.03	105.21	-0.0889	1.0142	1.2121
			789	315.6	85.93	106.46	-0.1067	0.9900	1.2265
			906	362.4	90.62	104.57	-0.0715	1.0440	1.2047
			1023	409.2	90.30	106.55	-0.0826	1.0403	1.2275
			1141	456.4	91.28	104.06	-0.0654	1.0516	1.1988
			1260	504.0	91.93	100.32	-0.0436	1.0591	1.1558
			1379	551.6	92.75	99.57	-0.0355	1.0685	1.1471
			1497	598.8	92.66	97.92	-0.0276	1.0675	1.1281
			1615	646.0	95.12	96.54	-0.0074	1.0959	1.1122
			1731	692.4	97.07	93.83	0.0170	1.1183	1.0810
			1847	738.8	93.72	92.24	0.0080	1.0797	1.0627
			1963	785.2	95.38	90.85	0.0243	1.0988	1.0467
			2077	830.8	94.84	90.91	0.0212	1.0926	1.0474
			2189	875.6	96.07	90.02	0.0325	1.1068	1.0371
			2300	920.0	95.17	89.86	0.0287	1.0964	1.0353
			2411	964.4	93.23	91.40	0.0099	1.0741	1.0530
			2522	1008.8	89.91	94.78	-0.0264	1.0358	1.0919

Table B1 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.4 s^{-1}, Wi_d = 0.75, Wi_m = 0.71, $D_0 \approx$ 85 (±5)μm, η_d = 6,880 Pa.s, η_m = 2,580 Pa.s, $\eta_r \approx$ 2.6, $N_{1,d}$ = 2,080 Pa, $N_{1,m}$ = 733 Pa, $N_{1,r}$ = 2.83, Ca ≈ 8.0, Γ = 5.84 mN/m) (Cont.)

Test	Gap (μm)	Do (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/ Do	c/ Do
10	2080	86.8	2632	1052.8	91.75	95.03	-0.0176	1.0570	1.0948
			2741	1096.4	90.50	94.98	-0.0242	1.0426	1.0942
			2850	1140.0	90.00	95.26	-0.0284	1.0369	1.0975
			2958	1183.2	88.88	96.31	-0.0401	1.0240	1.1096
			3066	1226.4	90.12	96.55	-0.0344	1.0382	1.1123
			3174	1269.6	88.67	97.14	-0.0456	1.0215	1.1191
			3281	1312.4	88.84	97.60	-0.0470	1.0235	1.1244
			3388	1355.2	87.92	99.06	-0.0596	1.0129	1.1412
			3495	1398.0	85.75	99.12	-0.0723	0.9879	1.1419
			3688	1475.2	86.35	99.75	-0.0720	0.9948	1.1492
			3881	1552.4	85.60	100.22	-0.0787	0.9862	1.1546
			3988	1595.2	85.84	99.68	-0.0746	0.9889	1.1484
			4095	1638.0	85.45	100.33	-0.0801	0.9844	1.1559
			4202	1680.8	85.49	100.59	-0.0811	0.9849	1.1589
			4308	1723.2	85.54	101.57	-0.0857	0.9855	1.1702
			4415	1766.0	84.07	101.83	-0.0955	0.9685	1.1732
			4521	1808.4	84.19	102.68	-0.0989	0.9699	1.1829
			4627	1850.8	83.40	103.86	-0.1093	0.9608	1.1965
			4733	1893.2	83.22	104.24	-0.1121	0.9588	1.2009
			4839	1935.6	84.06	103.35	-0.1029	0.9684	1.1907
			4945	1978.0	83.45	105.21	-0.1153	0.9614	1.2121
			5052	2020.8	83.29	105.10	-0.1158	0.9596	1.2108
			5159	2063.6	81.57	106.73	-0.1336	0.9397	1.2296
			5266	2106.4	81.31	107.06	-0.1367	0.9368	1.2334

Table B1 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.4 s^{-1}, Wi_d = 0.75, Wi_m = 0.71, $D_0 \approx$ 85 (±5) μm, η_d = 6,880 Pa.s, η_m = 2,580 Pa.s, $\eta_r \approx$ 2.6, $N_{1,d}$ = 2,080 Pa, $N_{1,m}$ = 733 Pa, $N_{1,r}$ = 2.83, Ca ≈ 8.0, Γ = 5.84 mN/m) (Cont.)

Test	Gap (μm)	Do (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/ Do	c/ Do
10	2080	86.8	5372	2148.8	81.39	107.61	-0.1387	0.9377	1.2397
			5478	2191.2	81.02	108.20	-0.1436	0.9334	1.2465
			5584	2233.6	81.00	108.29	-0.1442	0.9332	1.2476
			5690	2276.0	80.49	109.41	-0.1523	0.9273	1.2605
			5795	2318.0	80.51	109.76	-0.1537	0.9275	1.2645
			5900	2360.0	80.29	110.01	-0.1562	0.9250	1.2674
			6006	2402.4	80.55	110.57	-0.1571	0.9280	1.2738
			6112	2444.8	79.16	110.80	-0.1666	0.9120	1.2765
			6217	2486.8	79.35	110.97	-0.1661	0.9142	1.2785
			6322	2528.8	79.95	111.13	-0.1632	0.9211	1.2803
			6428	2571.2	79.94	111.69	-0.1657	0.9210	1.2868
			6533	2613.2	79.00	112.30	-0.1741	0.9101	1.2938
			6640	2656.0	79.37	112.11	-0.1710	0.9144	1.2916
			6746	2698.4	78.96	112.58	-0.1755	0.9097	1.2970
			6852	2740.8	78.99	112.88	-0.1766	0.9100	1.3005
			6959	2783.6	79.06	112.33	-0.1738	0.9108	1.2941
			7066	2826.4	79.67	111.53	-0.1666	0.9179	1.2849
			7173	2869.2	79.46	112.10	-0.1704	0.9154	1.2915
			7281	2912.4	79.25	113.06	-0.1758	0.9130	1.3025
			7389	2955.6	79.33	113.04	-0.1752	0.9139	1.3023
			7498	2999.2	78.87	113.71	-0.1809	0.9086	1.3100
			7607	3042.8	79.09	114.83	-0.1843	0.9112	1.3229
			7717	3086.8	79.34	114.41	-0.1810	0.9141	1.3181
			7825	3130.0	78.85	114.40	-0.1840	0.9084	1.3180

Table B1 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.4 s^{-1}, Wi_d = 0.75, Wi_m = 0.71, $D_0 \approx$ 85 (±5) μm, η_d = 6,880 Pa.s, η_m = 2,580 Pa.s, $\eta_r \approx$ 2.6, $N_{1,d}$ = 2,080 Pa, $N_{1,m}$ = 733 Pa, $N_{1,r}$ = 2.83, Ca ≈ 8.0, Γ = 5.84 mN/m) (Cont.)

Test	Gap (μm)	Do (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/ Do	c/ Do
10	2080	86.8	7934	3173.6	77.94	114.27	-0.1890	0.8979	1.3165
			8043	3217.2	78.05	114.35	-0.1887	0.8992	1.3174
			8152	3260.8	80.92	113.91	-0.1693	0.9323	1.3123
			8260	3304.0	80.44	114.15	-0.1732	0.9267	1.3151
			8368	3347.2	79.02	114.16	-0.1819	0.9104	1.3152
			8475	3390.0	79.48	115.20	-0.1835	0.9157	1.3272
			8582	3432.8	78.86	114.45	-0.1841	0.9085	1.3185
			8694	3477.6	77.36	113.83	-0.1908	0.8912	1.3114
			8805	3522.0	77.78	113.84	-0.1882	0.8961	1.3115
			8917	3566.8	77.96	113.01	-0.1835	0.8982	1.3020
			9030	3612.0	77.21	113.26	-0.1893	0.8895	1.3048
			9144	3657.6	77.18	113.76	-0.1916	0.8892	1.3106
			9258	3703.2	77.74	113.84	-0.1884	0.8956	1.3115
			9371	3748.4	77.55	113.22	-0.1870	0.8934	1.3044
			9485	3794.0	77.77	113.58	-0.1871	0.8960	1.3085
			9599	3839.6	77.23	113.97	-0.1922	0.8897	1.3130
			9713	3885.2	76.95	114.56	-0.1964	0.8865	1.3198
			9826	3930.4	77.48	114.28	-0.1919	0.8926	1.3166
			9940	3976.0	77.21	114.45	-0.1943	0.8895	1.3185
			10054	4021.6	76.81	114.53	-0.1971	0.8849	1.3195
			10167	4066.8	77.47	114.74	-0.1939	0.8925	1.3219
			10281	4112.4	76.41	114.91	-0.2012	0.8803	1.3238
			10395	4158.0	77.72	114.66	-0.1920	0.8954	1.3210
			10509	4203.6	76.90	115.20	-0.1994	0.8859	1.3272

Table B1 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.4 s^{-1}, Wi_d = 0.75, Wi_m = 0.71, $D_0 \approx 85$ (±5) μm, η_d = 6,880 Pa.s, η_m = 2,580 Pa.s, $\eta_r \approx 2.6$, $N_{1,d}$ = 2,080 Pa, $N_{1,m}$ = 733 Pa, $N_{1,r}$ = 2.83, Ca ≈ 8.0, Γ = 5.84 mN/m) (Cont.)

Test	Gap (μm)	Do (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/ Do	c/ Do
10	2080	86.8	10622	4248.8	76.64	115.08	-0.2005	0.8829	1.3258
			10736	4294.4	77.02	115.41	-0.1995	0.8873	1.3296
			10851	4340.4	76.94	115.19	-0.1991	0.8864	1.3271
			10966	4386.4	76.35	116.20	-0.2070	0.8796	1.3387
			11080	4432.0	76.54	115.79	-0.2041	0.8818	1.3340
			11194	4477.6	76.36	116.30	-0.2073	0.8797	1.3399
			11307	4522.8	76.22	116.92	-0.2107	0.8781	1.3470
			11417	4566.8	76.62	117.22	-0.2095	0.8827	1.3505
			11536	4614.4	76.88	116.93	-0.2066	0.8857	1.3471
			11643	4657.2	76.92	117.45	-0.2085	0.8862	1.3531
			11749	4699.6	76.73	117.63	-0.2104	0.8840	1.3552
			11854	4741.6	77.33	116.42	-0.2018	0.8909	1.3412
			11964	4785.6	76.01	115.62	-0.2067	0.8757	1.3320
			12072	4828.8	78.58	117.47	-0.1984	0.9053	1.3533
			12179	4871.6	76.28	116.36	-0.2081	0.8788	1.3406
			12287	4914.8	76.50	115.46	-0.2030	0.8813	1.3302
			12396	4958.4	77.08	115.84	-0.2009	0.8880	1.3346
			12504	5001.6	77.23	115.67	-0.1993	0.8897	1.3326
			12611	5044.4	76.81	115.79	-0.2024	0.8849	1.3340
			12717	5086.8	76.85	115.90	-0.2026	0.8854	1.3353
			12822	5128.8	76.47	116.08	-0.2057	0.8810	1.3373
			12934	5173.6	75.41	114.27	-0.2049	0.8688	1.3165
			13045	5218.0	75.62	114.78	-0.2057	0.8712	1.3224
			13156	5262.4	75.72	114.74	-0.2049	0.8724	1.3219

Table B2 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.4 s^{-1}, Wi_d = 0.75, Wi_m = 0.71, $D_0 \approx 52\ (\pm 5)$ μm, η_d = 6,880 Pa.s, η_m = 2,580 Pa.s, $\eta_r \approx 2.6$, $N_{1,d}$ = 2,080 Pa, $N_{1,m}$ = 733 Pa, $N_{1,r}$ = 2.83, Ca ≈ 5.0, Γ = 5.84 mN/m)

Test	Gap (μm)	Do (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/ Do	c/ Do
1	1700	52.3	3	1.2	52.13	50.85	0.0124	0.9967	0.9723
			6	2.4	50.68	47.89	0.0283	0.9690	0.9157
			9	3.6	51.43	47.20	0.0429	0.9834	0.9025
			12	4.8	52.76	50.57	0.0212	1.0088	0.9669
			15	6.0	51.27	49.39	0.0187	0.9803	0.9444
2	2070	51.4	18	7.2	52.36	48.70	0.0362	1.0187	0.9475
			22	8.8	51.27	48.63	0.0264	0.9975	0.9461
			32	12.8	52.05	50.08	0.0193	1.0126	0.9743
			37	14.8	51.05	50.21	0.0083	0.9932	0.9768
3	1800	51.7	45	18.0	51.72	49.48	0.0221	1.0004	0.9571
4	1950	52.0	4	1.6	52.60	50.31	0.0223	1.0115	0.9675
			10	4.0	53.02	49.08	0.0386	1.0196	0.9438
			16	6.4	50.43	48.30	0.0216	0.9698	0.9288
5	1920	50.5	75	30.0	48.20	46.48	0.0182	0.9545	0.9204
			85	34.0	50.73	49.83	0.0089	1.0046	0.9867
6	2100	51.0	2	0.8	50.64	49.92	0.0072	0.9929	0.9788
			17	6.8	51.90	48.87	0.0301	1.0176	0.9582
7	1930	51.5	50	20.0	50.78	48.65	0.0214	0.9860	0.9447
			55	22.0	52.77	49.65	0.0305	1.0247	0.9641
8	1600	55.2	65	26.0	53.38	50.62	0.0265	0.9670	0.9170
			95	38.0	53.60	52.83	0.0072	0.9710	0.9571
9	1980	54.6	119	47.6	57.29	58.12	-0.0072	1.0493	1.0645
			237	94.8	56.71	60.02	-0.0284	1.0386	1.0993
			355	142.0	55.62	61.05	-0.0465	1.0187	1.1181

Table B2 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.4 s^{-1}, Wi_d = 0.75, Wi_m = 0.71, $D_0 \approx 52$ (±5) μm, η_d = 6,880 Pa.s, η_m = 2,580 Pa.s, $\eta_r \approx 2.6$, $N_{1,d}$ = 2,080 Pa, $N_{1,m}$ = 733 Pa, $N_{1,r}$ = 2.83, Ca ≈ 5.0, Γ = 5.84 mN/m) (Cont.)

Test	Gap (μm)	Do (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/ Do	c/ Do
9	1980	54.6	472	188.8	55.70	62.46	-0.0572	1.0201	1.1440
			589	235.6	54.05	63.63	-0.0814	0.9899	1.1654
			706	282.4	54.69	63.37	-0.0735	1.0016	1.1606
			824	329.6	54.64	62.62	-0.0681	1.0007	1.1469
			942	376.8	55.18	61.77	-0.0563	1.0106	1.1313
			1061	424.4	54.96	60.58	-0.0486	1.0066	1.1095
			1180	472.0	56.86	60.17	-0.0283	1.0414	1.1020
			1298	519.2	56.66	57.84	-0.0103	1.0377	1.0593
			1416	566.4	57.99	56.28	0.0150	1.0621	1.0308
			1534	613.6	57.49	56.55	0.0082	1.0529	1.0357
			1653	661.2	57.48	55.57	0.0169	1.0527	1.0178
			1772	708.8	56.80	55.85	0.0084	1.0403	1.0229
			1891	756.4	57.19	55.31	0.0167	1.0474	1.0130
			2011	804.4	57.84	54.91	0.0260	1.0593	1.0057
			2131	852.4	56.57	54.37	0.0198	1.0361	0.9958
			2251	900.4	56.41	53.74	0.0242	1.0332	0.9842
			2371	948.4	56.48	53.68	0.0254	1.0344	0.9832
			2492	996.8	55.25	53.29	0.0181	1.0119	0.9760
			2613	1045.2	55.52	52.95	0.0237	1.0168	0.9698
			2735	1094.0	55.59	52.96	0.0242	1.0181	0.9700
			2857	1142.8	55.47	53.71	0.0161	1.0159	0.9837
			2979	1191.6	55.00	53.93	0.0098	1.0073	0.9877
			3101	1240.4	55.50	54.33	0.0107	1.0165	0.9951
			3222	1288.8	53.92	54.77	-0.0078	0.9875	1.0031

Table B2 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.4 s^{-1}, Wi_d = 0.75, Wi_m = 0.71, $D_0 \approx$ 52 (±5) μm, η_d = 6,880 Pa.s, η_m = 2,580 Pa.s, $\eta_r \approx$ 2.6, $N_{1,d}$ = 2,080 Pa, $N_{1,m}$ = 733 Pa, $N_{1,r}$ = 2.83, Ca ≈ 5.0, Γ = 5.84 mN/m) (Cont.)

Test	Gap (μm)	Do (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/ Do	c/ Do
9	1980	54.6	3345	1338.0	53.68	55.09	-0.0130	0.9832	1.0090
			3469	1387.6	52.21	54.46	-0.0211	0.9562	0.9974
			3594	1437.6	52.49	55.33	-0.0263	0.9614	1.0134
			3719	1487.6	52.92	54.55	-0.0152	0.9692	0.9991
			3842	1536.8	53.70	56.38	-0.0243	0.9835	1.0326
			3964	1585.6	53.43	56.83	-0.0308	0.9786	1.0408
			4086	1634.4	53.05	56.66	-0.0329	0.9716	1.0377
			4208	1683.2	53.48	57.67	-0.0377	0.9795	1.0562
			4330	1732.0	52.64	56.43	-0.0347	0.9641	1.0335
			4453	1781.2	52.23	56.21	-0.0367	0.9566	1.0295
			4576	1830.4	51.97	57.24	-0.0483	0.9518	1.0484
			4689	1875.6	53.34	57.17	-0.0347	0.9769	1.0471
			4820	1928.0	53.33	58.00	-0.0419	0.9767	1.0623
			4944	1977.6	52.39	57.20	-0.0439	0.9595	1.0476
			5066	2026.4	52.98	57.48	-0.0407	0.9703	1.0527
			5187	2074.8	52.85	57.61	-0.0431	0.9679	1.0551
			5308	2123.2	52.22	57.89	-0.0515	0.9564	1.0603
			5428	2171.2	52.10	56.92	-0.0442	0.9542	1.0425
			5548	2219.2	52.79	57.51	-0.0428	0.9668	1.0533
			5791	2316.4	52.16	57.54	-0.0490	0.9553	1.0538
			5913	2365.2	51.99	57.05	-0.0464	0.9522	1.0449
			6035	2414.0	51.29	57.14	-0.0540	0.9394	1.0465
			6157	2462.8	51.20	56.98	-0.0534	0.9377	1.0436
			6279	2511.6	51.78	57.71	-0.0542	0.9484	1.0570

Table B2 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.4 s^{-1}, Wi_d = 0.75, Wi_m = 0.71, $D_0 \approx 52$ (±5) μm, η_d = 6,880 Pa.s, η_m = 2,580 Pa.s, $\eta_r \approx 2.6$, $N_{1,d}$ = 2,080 Pa, $N_{1,m}$ = 733 Pa, $N_{1,r}$ = 2.83, Ca ≈ 5.0, Γ = 5.84 mN/m) (Cont.)

Test	Gap (μm)	Do (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/ Do	c/ Do
9	1980	54.6	6401	2560.4	51.62	57.72	-0.0558	0.9454	1.0571
			6523	2609.2	51.42	57.60	-0.0567	0.9418	1.0549
			6643	2657.2	52.81	58.40	-0.0503	0.9672	1.0696
			6762	2704.8	53.46	57.86	-0.0395	0.9791	1.0597
			6881	2752.4	51.80	56.08	-0.0397	0.9487	1.0271
			7003	2801.2	50.88	55.88	-0.0468	0.9319	1.0234
			7125	2850.0	50.85	54.97	-0.0389	0.9313	1.0068
			7249	2899.6	51.04	55.62	-0.0429	0.9348	1.0187
			7372	2948.8	50.57	55.62	-0.0476	0.9262	1.0187
			7496	2998.4	50.50	55.78	-0.0497	0.9249	1.0216
			7619	3047.6	51.27	55.97	-0.0438	0.9390	1.0251
			7742	3096.8	51.43	56.05	-0.0430	0.9419	1.0266
			7866	3146.4	50.92	56.36	-0.0507	0.9326	1.0322
			7988	3195.2	51.51	57.41	-0.0542	0.9434	1.0515
			8109	3243.6	51.86	58.21	-0.0577	0.9498	1.0661
			8229	3291.6	52.60	58.14	-0.0500	0.9634	1.0648
			8347	3338.8	52.20	58.98	-0.0610	0.9560	1.0802
			8462	3384.8	52.22	59.40	-0.0643	0.9564	1.0879
			8577	3430.8	51.65	58.95	-0.0660	0.9460	1.0797
			8691	3476.4	52.04	59.18	-0.0642	0.9531	1.0839
			8805	3522.0	52.83	58.88	-0.0542	0.9676	1.0784
			8918	3567.2	52.48	59.02	-0.0587	0.9612	1.0810
			9030	3612.0	52.06	58.57	-0.0588	0.9535	1.0727
			9254	3701.6	51.53	58.83	-0.0661	0.9438	1.0775

Table B3 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.4 s^{-1}, Wi_d = 0.75, Wi_m = 0.71, $D_0 \approx$ 125 (±7) μm, η_d = 6,880 Pa.s, η_m = 2,580 Pa.s, $\eta_r \approx$ 2.6, $N_{1,d}$ = 2,080 Pa, $N_{1,m}$ = 733 Pa, $N_{1,r}$ = 2.83, Ca ≈ 11.0, Γ = 5.84 mN/m)

Test	Gap (μm)	Do (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/ Do	c/ Do
1	2250	125.2	3	1.2	131.90	122.43	0.0372	1.0535	0.9779
			6	2.4	139.67	124.60	0.0570	1.1156	0.9952
			9	3.6	142.32	123.79	0.0696	1.1367	0.9887
			12	4.8	138.28	121.61	0.0641	1.1045	0.9713
			15	6.0	136.77	121.47	0.0592	1.0924	0.9702
			20	8.0	129.42	120.35	0.0363	1.0337	0.9613
2	1970	120.3	25	10.0	123.15	116.77	0.0266	1.0237	0.9707
			30	12.0	127.96	115.18	0.0526	1.0637	0.9574
			35	14.0	129.73	115.08	0.0598	1.0784	0.9566
			40	16.0	126.77	114.00	0.0530	1.0538	0.9476
			45	18.0	122.02	112.37	0.0412	1.0143	0.9341
			50	20.0	116.92	112.98	0.0171	0.9719	0.9392
3	2000	129.3	55	22.0	141.32	131.17	0.0372	1.0930	1.0145
			65	26.0	143.82	129.30	0.0532	1.1123	1.0000
			75	30.0	138.24	130.29	0.0296	1.0691	1.0077
			85	34.0	134.04	129.03	0.0190	1.0367	0.9979
			95	38.0	135.71	131.92	0.0142	1.0496	1.0203
4	1620	119.1	2	0.8	112.16	109.58	0.0116	0.9417	0.9201
			28	11.2	122.52	112.70	0.0417	1.0287	0.9463
			48	19.2	119.26	113.97	0.0227	1.0013	0.9569
5	2060	127.6	104	41.6	141.63	139.82	0.0064	1.1100	1.0958
			207	82.8	135.19	154.70	-0.0673	1.0595	1.2124
			310	124.0	133.35	164.09	-0.1033	1.0451	1.2860
			413	165.2	127.20	173.14	-0.1530	0.9969	1.3569

Table B3 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.4 s^{-1}, Wi_d = 0.75, Wi_m = 0.71, $D_0 \approx$ 125 (±7) μm, η_d = 6,880 Pa.s, η_m = 2,580 Pa.s, $\eta_r \approx$ 2.6, $N_{1,d}$ = 2,080 Pa, $N_{1,m}$ = 733 Pa, $N_{1,r}$ = 2.83, Ca ≈ 11.0, Γ = 5.84 mN/m) (Cont.)

Test	Gap (μm)	Do (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/ Do	c/ Do
5	2060	127.6	516	206.4	126.30	180.05	-0.1755	0.9898	1.4111
			618	247.2	125.26	183.26	-0.1880	0.9817	1.4362
			720	288.0	125.32	185.75	-0.1943	0.9821	1.4557
			822	328.8	127.66	184.32	-0.1816	1.0005	1.4445
			923	369.2	125.17	183.50	-0.1890	0.9810	1.4381
			1024	409.6	129.83	180.96	-0.1645	1.0175	1.4182
			1125	450.0	129.79	176.78	-0.1533	1.0172	1.3854
			1227	490.8	135.41	166.00	-0.1015	1.0612	1.3009
			1329	531.6	136.72	163.54	-0.0893	1.0715	1.2817
			1432	572.8	133.02	158.39	-0.0871	1.0425	1.2413
			1534	613.6	140.30	153.66	-0.0454	1.0995	1.2042
			1637	654.8	136.37	148.28	-0.0418	1.0687	1.1621
			1741	696.4	137.52	145.13	-0.0269	1.0777	1.1374
			1846	738.4	138.01	144.36	-0.0225	1.0816	1.1313
			1951	780.4	138.83	141.27	-0.0087	1.0880	1.1071
			2057	822.8	137.46	139.98	-0.0091	1.0773	1.0970
			2163	865.2	140.39	138.08	0.0083	1.1002	1.0821
			2269	907.6	140.20	132.05	0.0299	1.0987	1.0349
			2375	950.0	143.77	132.51	0.0408	1.1267	1.0385
			2483	993.2	139.72	130.36	0.0347	1.0950	1.0216
			2591	1036.4	139.49	129.98	0.0353	1.0932	1.0187
			2698	1079.2	137.18	132.86	0.0160	1.0751	1.0412
			2805	1122.0	137.48	134.31	0.0117	1.0774	1.0526
			2911	1164.4	132.31	141.09	-0.0321	1.0369	1.1057

Table B3 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.4 s^{-1}, Wi_d = 0.75, Wi_m = 0.71, $D_0 \approx$ 125 (±7) µm, η_d = 6,880 Pa.s, η_m = 2,580 Pa.s, $\eta_r \approx$ 2.6, $N_{1,d}$ = 2,080 Pa, $N_{1,m}$ = 733 Pa, $N_{1,r}$ = 2.83, Ca ≈ 11.0, Γ = 5.84 mN/m) (Cont.)

Test	Gap (µm)	Do (µm)	Time (s)	Strain	a* (µm)	c (µm)	Def*	a*/ Do	c/ Do
5	2060	127.6	3122	1248.8	130.80	150.76	-0.0709	1.0251	1.1815
			3226	1290.4	126.81	150.88	-0.0867	0.9938	1.1824
			3329	1331.6	125.53	152.14	-0.0958	0.9838	1.1923
			3432	1372.8	127.64	152.72	-0.0895	1.0003	1.1969
			3536	1414.4	124.56	155.92	-0.1118	0.9762	1.2219
			3641	1456.4	123.48	157.28	-0.1204	0.9677	1.2326
			3747	1498.8	123.06	161.40	-0.1348	0.9644	1.2649
			3853	1541.2	121.86	163.09	-0.1447	0.9550	1.2781
			3959	1583.6	121.25	168.15	-0.1621	0.9502	1.3178
			4065	1626.0	119.46	168.47	-0.1702	0.9362	1.3203
			4170	1668.0	120.36	167.81	-0.1647	0.9433	1.3151
			4276	1710.4	117.67	169.11	-0.1794	0.9222	1.3253
			4383	1753.2	114.46	172.28	-0.2016	0.8970	1.3502
			4489	1795.6	113.02	174.16	-0.2129	0.8857	1.3649
			4594	1837.6	114.66	175.94	-0.2109	0.8986	1.3788
			4698	1879.2	113.95	179.14	-0.2224	0.8930	1.4039
			4802	1920.8	113.23	179.43	-0.2262	0.8874	1.4062
			5006	2002.4	110.83	184.17	-0.2486	0.8686	1.4433
			5108	2043.2	110.12	187.97	-0.2612	0.8630	1.4731
			5210	2084.0	109.81	189.47	-0.2662	0.8606	1.4849
			5311	2124.4	108.42	191.24	-0.2764	0.8497	1.4987
			5411	2164.4	106.90	193.06	-0.2872	0.8378	1.5130
			5510	2204.0	107.96	194.37	-0.2858	0.8461	1.5233
			5605	2242.0	103.68	197.91	-0.3124	0.8125	1.5510

Table B3 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.4 s^{-1}, Wi_d = 0.75, Wi_m = 0.71, $D_0 \approx$ 125 (±7) µm, η_d = 6,880 Pa.s, η_m = 2,580 Pa.s, $\eta_r \approx$ 2.6, $N_{1,d}$ = 2,080 Pa, $N_{1,m}$ = 733 Pa, $N_{1,r}$ = 2.83, Ca ≈ 11.0, Γ = 5.84 mN/m) (Cont.)

Test	Gap (µm)	Do (µm)	Time (s)	Strain	a* (µm)	c (µm)	Def*	a*/ Do	c/ Do
5	2060	127.6	5905	2362.0	103.29	192.30	-0.3011	0.8095	1.5071
			6001	2400.4	101.98	192.31	-0.3069	0.7992	1.5071
			6097	2438.8	105.58	195.26	-0.2981	0.8274	1.5303
			6190	2476.0	100.86	195.99	-0.3205	0.7904	1.5360
			6283	2513.2	99.54	197.15	-0.3290	0.7801	1.5451
			6376	2550.4	97.90	198.14	-0.3386	0.7672	1.5528
			6469	2587.6	97.44	200.42	-0.3457	0.7636	1.5707
			6562	2624.8	97.25	202.27	-0.3506	0.7621	1.5852
			6757	2702.8	93.62	201.19	-0.3649	0.7337	1.5767
			6847	2738.8	93.54	204.55	-0.3724	0.7331	1.6031
			6934	2773.6	96.05	213.88	-0.3802	0.7527	1.6762
			7021	2808.4	95.49	215.26	-0.3854	0.7484	1.6870
			7108	2843.2	93.01	217.80	-0.4015	0.7289	1.7069
			7194	2877.6	94.10	221.61	-0.4039	0.7375	1.7368
			7280	2912.0	91.97	222.46	-0.4150	0.7208	1.7434
			7366	2946.4	89.16	224.92	-0.4322	0.6987	1.7627
			7451	2980.4	89.06	227.98	-0.4382	0.6980	1.7867
			7536	3014.4	91.71	232.22	-0.4338	0.7187	1.8199
			7621	3048.4	87.25	233.82	-0.4565	0.6838	1.8324
			7706	3082.4	89.54	237.45	-0.4523	0.7017	1.8609
			7791	3116.4	87.02	239.23	-0.4665	0.6820	1.8748
			7876	3150.4	84.42	242.79	-0.4840	0.6616	1.9027
			7961	3184.4	85.25	248.70	-0.4894	0.6681	1.9491
			8045	3218.0	82.17	254.67	-0.5121	0.6440	1.9958

Table B3 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.4 s^{-1}, Wi_d = 0.75, Wi_m = 0.71, $D_0 \approx$ 125 (±7) μm, η_d = 6,880 Pa.s, η_m = 2,580 Pa.s, $\eta_r \approx$ 2.6, $N_{1,d}$ = 2,080 Pa, $N_{1,m}$ = 733 Pa, $N_{1,r}$ = 2.83, Ca ≈ 11.0, Γ = 5.84 mN/m) (Cont.)

Test	Gap (μm)	Do (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/ Do	c/ Do
5	2060	127.6	8128	3251.2	80.45	258.04	-0.5247	0.6305	2.0223
			8211	3284.4	78.13	264.30	-0.5437	0.6123	2.0713
			8293	3317.2	76.34	272.85	-0.5628	0.5983	2.1383
			8374	3349.6	75.08	275.38	-0.5715	0.5884	2.1582
			8455	3382.0	73.17	279.14	-0.5846	0.5734	2.1876
			8618	3447.2	71.11	295.77	-0.6124	0.5573	2.3179
			8699	3479.6	70.90	304.58	-0.6224	0.5556	2.3870
			8780	3512.0	68.65	318.73	-0.6456	0.5380	2.4979
			8861	3544.4	67.46	326.13	-0.6572	0.5287	2.5559
			8942	3576.8	69.07	338.39	-0.6610	0.5413	2.6520
			9102	3640.8	64.68	360.83	-0.6960	0.5069	2.8278
			9181	3672.4	63.62	377.00	-0.7112	0.4986	2.9545
			9338	3735.2	68.91	417.16	-0.7165	0.5400	3.2693
			9415	3766.0	67.29	442.34	-0.7359	0.5274	3.4666
			9492	3796.8	62.87	464.52	-0.7616	0.4927	3.6404
			9568	3827.2	65.86	471.88	-0.7550	0.5161	3.6981
			9645	3858.0	60.91	487.31	-0.7778	0.4774	3.8190
			9722	3888.8	61.12	500.66	-0.7824	0.4790	3.9237
			9799	3919.6	62.73	528.73	-0.7879	0.4916	4.1437
			9876	3950.4	55.81	563.90	-0.8199	0.4374	4.4193
			9953	3981.2	53.58	601.44	-0.8364	0.4199	4.7135
			10030	4012.0	53.17	618.02	-0.8416	0.4167	4.8434
			10107	4042.8	57.95	631.06	-0.8318	0.4542	4.9456
			10184	4073.6	50.96	660.96	-0.8568	0.3994	5.1799

Table B4 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.63 s^{-1}, Wi_d = 0.99, Wi_m = 0.80, $D_0 \approx$ 56 (±2) μm, η_d = 6,340 Pa.s, η_m = 2,440 Pa.s, $\eta_r \approx$ 2.6, $N_{1,d}$ = 3,950 Pa, $N_{1,m}$ = 1,230 Pa, $N_{1,r}$ = 3.20, Ca ≈ 8.0, Γ = 5.84 mN/m)

Test	Gap (μm)	Do (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/ Do	c/ Do
1	1840	57.7	81	51.0	60.66	59.37	0.0107	1.0513	1.0289
			163	102.7	57.17	63.61	-0.0533	0.9908	1.1024
			245	154.4	55.91	66.21	-0.0843	0.9690	1.1475
			328	206.6	56.21	66.96	-0.0873	0.9742	1.1605
			412	259.6	55.12	70.02	-0.1191	0.9553	1.2135
			582	366.7	53.03	66.42	-0.1121	0.9191	1.1511
			667	420.2	54.87	66.35	-0.0947	0.9510	1.1499
			752	473.8	56.58	64.51	-0.0655	0.9806	1.1180
			836	526.7	56.65	63.73	-0.0588	0.9818	1.1045
			919	579.0	57.20	62.27	-0.0424	0.9913	1.0792
			1002	631.3	56.59	61.78	-0.0438	0.9808	1.0707
			1085	683.6	56.52	60.15	-0.0311	0.9795	1.0425
			1167	735.2	58.13	60.45	-0.0196	1.0075	1.0477
			1249	786.9	57.37	59.95	-0.0220	0.9943	1.0390
			1331	838.5	59.98	57.48	0.0213	1.0395	0.9962
			1414	890.8	59.56	56.64	0.0251	1.0322	0.9816
			1496	942.5	59.82	55.08	0.0413	1.0367	0.9546
			1578	994.1	60.06	56.39	0.0315	1.0409	0.9773
			1661	1046.4	59.88	56.55	0.0286	1.0378	0.9801
			1744	1098.7	56.09	61.08	-0.0426	0.9721	1.0586
			1827	1151.0	55.30	60.61	-0.0458	0.9584	1.0504
			1911	1203.9	54.83	61.21	-0.0550	0.9503	1.0608
			1994	1256.2	54.23	61.32	-0.0614	0.9399	1.0627
			2079	1309.8	52.86	60.67	-0.0688	0.9161	1.0515

Table B4 Raw data of the transient experiment (System A at 143 °C; γ = 0.63 s^{-1}, Wi_d = 0.99, Wi_m = 0.80, $D_0 \approx 56$ (±2) μm, η_d = 6,340 Pa.s, η_m = 2,440 Pa.s, $\eta_r \approx 2.6$, $N_{1,d}$ = 3,950 Pa, $N_{1,m}$ = 1,230 Pa, $N_{1,r}$ = 3.20, Ca ≈ 8.0, Γ = 5.84 mN/m) (Cont.)

Test	Gap (μm)	Do (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/ Do	c/ Do
1	1840	57.7	2164	1363.3	53.34	62.43	-0.0785	0.9244	1.0820
			2250	1417.5	53.13	61.85	-0.0758	0.9208	1.0719
			2336	1471.7	51.99	61.52	-0.0840	0.9010	1.0662
			2422	1525.9	51.13	62.12	-0.0970	0.8861	1.0766
			2509	1580.7	50.85	62.96	-0.1064	0.8813	1.0912
			2595	1634.9	50.00	61.51	-0.1032	0.8666	1.0660
			2682	1689.7	50.29	62.28	-0.1065	0.8716	1.0794
			2770	1745.1	50.12	63.82	-0.1202	0.8686	1.1061
			2859	1801.2	49.39	63.16	-0.1223	0.8560	1.0946
			2947	1856.6	49.87	64.04	-0.1244	0.8643	1.1099
			3036	1912.7	52.32	67.32	-0.1254	0.9068	1.1667
			3125	1968.8	52.22	67.96	-0.1310	0.9050	1.1778
			3214	2024.8	52.05	67.68	-0.1305	0.9021	1.1730
			3303	2080.9	52.29	68.20	-0.1320	0.9062	1.1820
			3391	2136.3	52.12	67.92	-0.1316	0.9033	1.1771
			3479	2191.8	51.89	68.39	-0.1372	0.8993	1.1853
			3568	2247.8	52.00	68.67	-0.1381	0.9012	1.1901
			3655	2302.7	52.06	68.42	-0.1358	0.9023	1.1858
			3743	2358.1	51.48	68.42	-0.1413	0.8922	1.1858
			3831	2413.5	51.00	68.30	-0.1450	0.8839	1.1837
			3920	2469.6	51.40	68.61	-0.1434	0.8908	1.1891
			4008	2525.0	51.30	68.07	-0.1405	0.8891	1.1797
			4095	2579.9	51.33	68.88	-0.1460	0.8896	1.1938
			4183	2635.3	51.79	69.12	-0.1433	0.8976	1.1979

Table B4 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.63 s^{-1}, Wi_d = 0.99, Wi_m = 0.80, $D_0 \approx$ 56 (±2) μm, η_d = 6,340 Pa.s, η_m = 2,440 Pa.s, $\eta_r \approx$ 2.6, $N_{1,d}$ = 3,950 Pa, $N_{1,m}$ = 1,230 Pa, $N_{1,r}$ = 3.20, Ca ≈ 8.0, Γ = 5.84 mN/m) (Cont.)

Test	Gap (μm)	Do (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/ Do	c/ Do
1	1840	57.7	4271	2690.7	50.18	67.57	-0.1477	0.8697	1.1711
			4446	2801.0	51.35	68.93	-0.1462	0.8899	1.1946
			4534	2856.4	50.96	68.86	-0.1494	0.8832	1.1934
			4622	2911.9	51.55	68.24	-0.1393	0.8934	1.1827
			4711	2967.9	50.81	68.29	-0.1468	0.8806	1.1835
			4800	3024.0	51.37	68.14	-0.1403	0.8903	1.1809
			4888	3079.4	51.14	68.87	-0.1477	0.8863	1.1936
			4976	3134.9	51.51	69.06	-0.1456	0.8927	1.1969
			5064	3190.3	51.26	68.72	-0.1455	0.8884	1.1910
			5151	3245.1	51.14	68.03	-0.1417	0.8863	1.1790
			5238	3299.9	51.45	67.78	-0.1370	0.8917	1.1747
			5326	3355.4	51.50	67.55	-0.1348	0.8925	1.1707
			5414	3410.8	51.17	67.81	-0.1399	0.8868	1.1752
			5502	3466.3	51.13	67.69	-0.1394	0.8861	1.1731
			5673	3574.0	50.97	67.57	-0.1400	0.8834	1.1711
			5758	3627.5	50.72	68.24	-0.1473	0.8790	1.1827
			5843	3681.1	50.82	67.50	-0.1410	0.8808	1.1698
			5928	3734.6	50.97	68.68	-0.1480	0.8834	1.1903
			6014	3788.8	50.95	68.02	-0.1435	0.8830	1.1789
			6101	3843.6	51.06	67.87	-0.1413	0.8849	1.1763
2	2170	56.2	67	42.2	57.63	56.40	0.0108	1.0254	1.0036
			135	85.1	55.10	59.40	-0.0376	0.9804	1.0569
			203	127.9	54.78	61.26	-0.0558	0.9747	1.0900

Table B4 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.63 s^{-1}, Wi_d = 0.99, Wi_m = 0.80, $D_0 \approx$ 56 (±2) μm, η_d = 6,340 Pa.s, η_m = 2,440 Pa.s, $\eta_r \approx$ 2.6, $N_{1,d}$ = 3,950 Pa, $N_{1,m}$ = 1,230 Pa, $N_{1,r}$ = 3.20, Ca ≈ 8.0, Γ = 5.84 mN/m) (Cont.)

Test	Gap (μm)	Do (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/ Do	c/ Do
2	2170	56.2	270	170.1	54.03	62.20	-0.0703	0.9614	1.1068
			338	212.9	53.84	63.15	-0.0796	0.9580	1.1237
			405	255.2	54.70	62.79	-0.0689	0.9733	1.1173
			472	297.4	54.19	62.42	-0.0706	0.9642	1.1107
			539	339.6	53.72	61.74	-0.0695	0.9559	1.0986
			606	381.8	54.84	61.92	-0.0606	0.9758	1.1018
			672	423.4	55.41	61.12	-0.0490	0.9859	1.0875
			738	464.9	55.26	59.47	-0.0367	0.9833	1.0582
			805	507.2	54.44	58.50	-0.0359	0.9687	1.0409
			873	550.0	56.19	58.01	-0.0159	0.9998	1.0322
			941	592.8	55.38	57.74	-0.0209	0.9854	1.0274
			1075	677.3	55.18	56.93	-0.0156	0.9819	1.0130
			1142	719.5	55.56	56.54	-0.0087	0.9886	1.0060
			1209	761.7	56.62	55.95	0.0060	1.0075	0.9956
			1276	803.9	56.56	55.62	0.0084	1.0064	0.9897
			1343	846.1	56.90	54.82	0.0186	1.0125	0.9754
			1410	888.3	56.92	54.80	0.0190	1.0128	0.9751
			1477	930.5	56.77	54.95	0.0163	1.0101	0.9778
			1544	972.7	56.90	55.44	0.0130	1.0125	0.9865
			1610	1014.3	56.60	55.57	0.0092	1.0071	0.9888
			1676	1055.9	56.26	57.32	-0.0094	1.0010	1.0199
			1742	1097.5	55.96	59.19	-0.0281	0.9957	1.0532
			1808	1139.0	55.57	58.34	-0.0243	0.9888	1.0381
			1874	1180.6	54.40	58.38	-0.0353	0.9680	1.0388

Table B4 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.63 s^{-1}, Wi_d = 0.99, Wi_m = 0.80, $D_0 \approx 56$ (±2) μm, η_d = 6,340 Pa.s, η_m = 2,440 Pa.s, $\eta_r \approx 2.6$, $N_{1,d}$ = 3,950 Pa, $N_{1,m}$ = 1,230 Pa, $N_{1,r}$ = 3.20, Ca ≈ 8.0, Γ = 5.84 mN/m) (Cont.)

Test	Gap (μm)	Do (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/ Do	c/ Do
2	2170	56.2	2005	1263.2	54.95	57.81	-0.0254	0.9778	1.0286
			2069	1303.5	54.53	58.25	-0.0330	0.9703	1.0365
			2133	1343.8	54.33	59.91	-0.0488	0.9667	1.0660
			2197	1384.1	54.29	59.31	-0.0442	0.9660	1.0553
			2261	1424.4	53.86	59.38	-0.0487	0.9584	1.0566
			2324	1464.1	52.85	57.70	-0.0439	0.9404	1.0267
			2388	1504.4	52.96	60.14	-0.0635	0.9423	1.0701
			2452	1544.8	53.09	60.08	-0.0618	0.9447	1.0690
			2515	1584.5	52.59	58.98	-0.0573	0.9358	1.0495
			2576	1622.9	52.81	60.89	-0.0711	0.9397	1.0835
			2641	1663.8	52.88	61.89	-0.0785	0.9409	1.1012
			2764	1741.3	52.44	62.24	-0.0855	0.9331	1.1075
			2825	1779.8	52.17	62.48	-0.0899	0.9283	1.1117
			2885	1817.6	52.18	62.80	-0.0924	0.9285	1.1174
			2944	1854.7	51.78	62.95	-0.0974	0.9214	1.1201
			3063	1929.7	51.49	64.24	-0.1102	0.9162	1.1431
			3181	2004.0	51.38	63.78	-0.1077	0.9142	1.1349
			3239	2040.6	51.39	64.02	-0.1094	0.9144	1.1391
			3296	2076.5	51.24	63.79	-0.1091	0.9117	1.1351
			3354	2113.0	51.42	64.07	-0.1095	0.9149	1.1400
			3411	2148.9	51.36	64.15	-0.1107	0.9139	1.1415
			3468	2184.8	51.34	64.08	-0.1104	0.9135	1.1402
			3525	2220.8	50.99	64.53	-0.1172	0.9073	1.1482
			3582	2256.7	50.87	64.25	-0.1162	0.9052	1.1432

Table B4 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.63 s^{-1}, Wi_d = 0.99, Wi_m = 0.80, $D_0 \approx 56$ (±2) µm, η_d = 6,340 Pa.s, η_m = 2,440 Pa.s, $\eta_r \approx 2.6$, $N_{1,d}$ = 3,950 Pa, $N_{1,m}$ = 1,230 Pa, $N_{1,r}$ = 3.20, Ca ≈ 8.0, Γ = 5.84 mN/m) (Cont.)

Test	Gap (µm)	Do (µm)	Time (s)	Strain	a* (µm)	c (µm)	Def*	a*/ Do	c/ Do
2	2170	56.2	3697	2329.1	51.37	64.39	-0.1125	0.9141	1.1457
			3752	2363.8	50.21	63.78	-0.1190	0.8934	1.1349
			3807	2398.4	50.65	64.35	-0.1191	0.9012	1.1450
			3861	2432.4	50.35	65.00	-0.1270	0.8959	1.1566
			3915	2466.5	50.11	64.53	-0.1258	0.8916	1.1482
			3969	2500.5	50.73	64.43	-0.1190	0.9027	1.1464
			4023	2534.5	50.89	65.09	-0.1224	0.9055	1.1582
			4076	2567.9	50.10	64.72	-0.1273	0.8915	1.1516
			4129	2601.3	50.08	65.26	-0.1316	0.8911	1.1612
			4182	2634.7	50.83	65.93	-0.1293	0.9044	1.1731
			4234	2667.4	50.17	64.71	-0.1266	0.8927	1.1514
			4287	2700.8	50.72	64.62	-0.1205	0.9025	1.1498
			4339	2733.6	49.96	64.63	-0.1280	0.8890	1.1500
			4391	2766.3	50.67	65.11	-0.1247	0.9016	1.1585
			4443	2799.1	50.15	65.08	-0.1296	0.8923	1.1580
			4494	2831.2	49.60	65.36	-0.1371	0.8826	1.1630
			4545	2863.4	49.67	65.89	-0.1404	0.8838	1.1724
			4595	2894.9	49.55	65.52	-0.1388	0.8817	1.1658
			4645	2926.4	49.87	64.92	-0.1311	0.8874	1.1552
			4745	2989.4	49.51	65.75	-0.1409	0.8810	1.1699
			4843	3051.1	48.79	64.12	-0.1358	0.8681	1.1409
			4939	3111.6	49.37	64.43	-0.1323	0.8785	1.1464
			5125	3228.8	48.97	65.04	-0.1410	0.8714	1.1573
			5218	3287.3	50.53	65.54	-0.1293	0.8991	1.1662

Table B4 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.63 s^{-1}, Wi_d = 0.99, Wi_m = 0.80, $D_0 \approx$ 56 (±2) μm, η_d = 6,340 Pa.s, η_m = 2,440 Pa.s, $\eta_r \approx$ 2.6, $N_{1,d}$ = 3,950 Pa, $N_{1,m}$ = 1,230 Pa, $N_{1,r}$ = 3.20, Ca ≈ 8.0, Γ = 5.84 mN/m) (Cont.)

Test	Gap (μm)	Do (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/ Do	c/ Do
2	2170	56.2	5310	3345.3	49.68	65.51	-0.1374	0.8840	1.1657
			5445	3430.4	49.85	65.95	-0.1390	0.8870	1.1735
			5534	3486.4	50.16	65.24	-0.1307	0.8925	1.1609
			5665	3569.0	50.54	65.84	-0.1315	0.8993	1.1715
			5751	3623.1	50.62	65.43	-0.1276	0.9007	1.1642
			5836	3676.7	50.95	66.56	-0.1328	0.9066	1.1843

Table B5 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.17 s^{-1}, Wi_d = 0.45, Wi_m = 0.43, D_0 = 177.3 μm, η_d = 7,616 Pa.s, η_m = 2,872 Pa.s, $\eta_r \approx 2.6$, $N_{1,d}$ = 620.0 Pa, $N_{1,m}$ = 208.5 Pa, $N_{1,r}$ = 2.97, Ca ≈ 8.0, Γ = 5.84 mN/m)

Gap (μm)	Do (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/ Do	c/ Do
1780	177.3	334	56.8	202.54	198.43	0.0103	1.1424	1.1192
		668	113.6	196.22	219.19	-0.0553	1.1067	1.2363
		1002	170.3	192.74	225.81	-0.0790	1.0871	1.2736
		1330	226.1	189.99	232.23	-0.1000	1.0716	1.3098
		1657	281.7	193.49	231.66	-0.0898	1.0913	1.3066
		1985	337.5	196.67	229.44	-0.0769	1.1092	1.2941
		2317	393.9	197.57	222.54	-0.0594	1.1143	1.2552
		2647	450.0	214.60	202.20	0.0298	1.2104	1.1404
		3315	563.6	214.04	199.05	0.0363	1.2072	1.1227
		3650	620.5	217.31	187.64	0.0733	1.2257	1.0583
		3982	676.9	218.59	180.97	0.0942	1.2329	1.0207
		4313	733.2	219.92	176.78	0.1087	1.2404	0.9971
		4639	788.6	216.67	173.86	0.1096	1.2221	0.9806
		4963	843.7	219.42	177.94	0.1044	1.2376	1.0036
		5280	897.6	223.66	175.16	0.1216	1.2615	0.9879
		5603	952.5	214.71	171.22	0.1127	1.2110	0.9657
		5920	1006.4	214.86	173.72	0.1059	1.2118	0.9798
		6235	1060.0	213.41	171.93	0.1076	1.2037	0.9697
		6545	1112.7	219.42	169.94	0.1271	1.2376	0.9585
		6864	1166.9	215.66	168.36	0.1232	1.2164	0.9496
		7180	1220.6	210.44	168.74	0.1100	1.1869	0.9517
		7496	1274.3	214.86	171.05	0.1135	1.2118	0.9647
		7812	1328.0	209.26	169.91	0.1038	1.1803	0.9583
		8128	1381.8	207.36	170.04	0.0989	1.1695	0.9591
		8444	1435.5	204.39	174.20	0.0797	1.1528	0.9825
		8761	1489.4	199.97	181.03	0.0497	1.1279	1.0210
		9079	1543.4	197.10	181.43	0.0414	1.1117	1.0233
		9399	1597.8	197.94	184.10	0.0362	1.1164	1.0384
		9721	1652.6	192.51	186.43	0.0160	1.0858	1.0515
		10045	1707.7	193.52	188.18	0.0140	1.0915	1.0614
		10371	1763.1	190.13	186.89	0.0086	1.0724	1.0541
		10698	1818.7	186.49	190.54	-0.0107	1.0518	1.0747
		11027	1874.6	185.95	195.33	-0.0246	1.0488	1.1017

Table B5 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.17 s^{-1}, Wi_d = 0.45, Wi_m = 0.43, D_0 = 177.3 μm, η_d = 7,616 Pa.s, η_m = 2,872 Pa.s, $\eta_r \approx$ 2.6, $N_{1,d}$ = 620.0 Pa, $N_{1,m}$ = 208.5 Pa, $N_{1,r}$ = 2.97, Ca ≈ 8.0, Γ = 5.84 mN/m) (Cont.)

Gap (μm)	Do (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/ Do	c/ Do
1780	177.3	11356	1930.5	184.67	197.14	-0.0327	1.0416	1.1119
		11686	1986.6	183.34	195.96	-0.0333	1.0341	1.1052
		12020	2043.4	181.36	199.62	-0.0479	1.0229	1.1259
		12356	2100.5	181.33	202.15	-0.0543	1.0227	1.1402
		12691	2157.5	177.28	204.27	-0.0707	0.9999	1.1521
		13028	2214.8	178.25	205.77	-0.0717	1.0054	1.1606
		13364	2271.9	176.97	207.33	-0.0790	0.9981	1.1694
		13700	2329.0	176.17	208.40	-0.0838	0.9936	1.1754
		14035	2386.0	174.46	211.41	-0.0958	0.9840	1.1924
		14368	2442.6	173.75	212.00	-0.0992	0.9800	1.1957
		14700	2499.0	174.10	210.75	-0.0952	0.9820	1.1887
		15033	2555.6	174.59	211.59	-0.0958	0.9847	1.1934
		15364	2611.9	172.22	214.09	-0.1084	0.9713	1.2075
		15695	2668.2	170.14	217.48	-0.1221	0.9596	1.2266
		16024	2724.1	169.03	220.32	-0.1317	0.9534	1.2426
		16354	2780.2	168.13	221.85	-0.1378	0.9483	1.2513
		16681	2835.8	167.08	223.47	-0.1444	0.9424	1.2604
		17009	2891.5	167.69	224.15	-0.1441	0.9458	1.2642
		17339	2947.6	167.23	225.19	-0.1477	0.9432	1.2701
		17666	3003.2	165.32	227.94	-0.1592	0.9324	1.2856
		17986	3057.6	164.21	230.35	-0.1676	0.9262	1.2992
		18301	3111.2	164.33	229.97	-0.1665	0.9268	1.2971
		18614	3164.4	164.35	231.98	-0.1706	0.9270	1.3084
		18928	3217.8	163.87	233.23	-0.1747	0.9243	1.3155
		19242	3271.1	162.61	232.27	-0.1764	0.9171	1.3100
		19558	3324.9	162.45	232.78	-0.1779	0.9162	1.3129
		19873	3378.4	162.49	233.01	-0.1783	0.9165	1.3142
		20184	3431.3	161.92	232.95	-0.1799	0.9133	1.3139
		20497	3484.5	161.97	235.12	-0.1842	0.9135	1.3261
		20809	3537.5	162.05	236.54	-0.1869	0.9140	1.3341
		21125	3591.3	161.76	236.74	-0.1882	0.9124	1.3353
		21449	3646.3	161.41	237.89	-0.1915	0.9104	1.3417
		21773	3701.4	161.47	238.24	-0.1921	0.9107	1.3437

Table B5 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.17 s^{-1}, Wi_d = 0.45, Wi_m = 0.43, D_0 = 177.3 μm, η_d = 7,616 Pa.s, η_m = 2,872 Pa.s, $\eta_r \approx 2.6$, $N_{1,d}$ = 620.0 Pa, $N_{1,m}$ = 208.5 Pa, $N_{1,r}$ = 2.97, Ca ≈ 8.0, Γ = 5.84 mN/m) (Cont.)

Gap (μm)	Do (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/ Do	c/ Do
1780	177.3	22098	3756.7	161.49	239.15	-0.1938	0.9108	1.3488
		22421	3811.6	160.78	238.76	-0.1952	0.9068	1.3466
		22744	3866.5	160.68	238.94	-0.1958	0.9063	1.3477
		23062	3920.5	160.24	239.55	-0.1984	0.9038	1.3511
		23375	3973.8	159.98	239.54	-0.1991	0.9023	1.3510
		23685	4026.5	160.84	239.87	-0.1972	0.9072	1.3529
		23998	4079.7	159.18	239.59	-0.2016	0.8978	1.3513
		24313	4133.2	157.60	239.40	-0.2060	0.8889	1.3503
		24625	4186.3	159.42	240.19	-0.2021	0.8992	1.3547
		24937	4239.3	157.73	241.86	-0.2105	0.8896	1.3641
		25248	4292.2	158.19	240.93	-0.2073	0.8922	1.3589
		25559	4345.0	157.41	241.21	-0.2102	0.8878	1.3605
		25870	4397.9	157.17	240.06	-0.2087	0.8865	1.3540
		26178	4450.3	156.59	242.32	-0.2149	0.8832	1.3667
		26485	4502.5	156.88	242.56	-0.2145	0.8848	1.3681
		26791	4554.5	156.01	242.69	-0.2174	0.8799	1.3688
		27094	4606.0	156.80	243.78	-0.2171	0.8844	1.3750
		27698	4708.7	156.14	245.21	-0.2219	0.8807	1.3830
		28001	4760.2	155.88	245.11	-0.2225	0.8792	1.3825
		28309	4812.5	154.83	245.77	-0.2270	0.8733	1.3862
		28619	4865.2	154.52	246.42	-0.2292	0.8715	1.3898
		28931	4918.3	154.69	246.23	-0.2283	0.8725	1.3888
		29241	4971.0	154.41	246.44	-0.2296	0.8709	1.3900
		29552	5023.8	154.15	246.32	-0.2302	0.8694	1.3893
		29861	5076.4	154.23	246.48	-0.2302	0.8699	1.3902
		30171	5129.1	154.47	246.92	-0.2303	0.8712	1.3927

Table B6 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.10 s^{-1}, Wi_d = 0.34, Wi_m = 0.26, $D_0 \approx$ 289.7 μm, η_d = 7,996 Pa.s, η_m = 3,026 Pa.s, $\eta_r \approx$ 2.6, $N_{1,d}$ = 276 Pa, $N_{1,m}$ = 78.3 Pa, $N_{1,r}$ = 3.52, Ca ≈ 8.0, Γ = 5.84)

Gap (μm)	D_0 (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/D_0	c/D_0
1900	289.7	489	48.9	338.09	305.16	0.0512	1.1670	1.0534
		991	99.1	338.65	318.06	0.0314	1.1690	1.0979
		1494	149.4	311.64	364.55	-0.0782	1.0757	1.2584
		1988	198.8	304.02	367.02	-0.0939	1.0494	1.2669
		2479	247.9	299.17	369.97	-0.1058	1.0327	1.2771
		2978	297.8	302.72	379.40	-0.1124	1.0449	1.3096
		3489	348.9	314.33	362.61	-0.0713	1.0850	1.2517
		3994	399.4	304.59	347.20	-0.0654	1.0514	1.1985
		4509	450.9	308.55	339.68	-0.0480	1.0651	1.1725
		5025	502.5	309.33	342.77	-0.0513	1.0678	1.1832
		5545	554.5	323.90	341.01	-0.0257	1.1181	1.1771
		6076	607.6	348.19	328.40	0.0292	1.2019	1.1336
		6615	661.5	338.97	291.32	0.0756	1.1701	1.0056
		7150	715	346.04	277.91	0.1092	1.1945	0.9593
		7693	769.3	338.52	272.37	0.1083	1.1685	0.9402
		8246	824.6	345.21	271.30	0.1199	1.1916	0.9365
		8799	879.9	378.84	281.94	0.1466	1.3077	0.9732
		9352	935.2	346.79	270.27	0.1240	1.1971	0.9329
		9912	991.2	344.62	268.23	0.1246	1.1896	0.9259
		10459	1045.9	351.16	248.66	0.1709	1.2122	0.8583
		10991	1099.1	352.32	266.94	0.1379	1.2162	0.9214
		11532	1153.2	338.56	255.81	0.1392	1.1687	0.8830
		12082	1208.2	328.98	260.67	0.1158	1.1356	0.8998

Table B6 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.10 s^{-1}, Wi_d = 0.34, Wi_m = 0.26, $D_0 \approx$ 289.7 μm, η_d = 7,996 Pa.s, η_m = 3,026 Pa.s, $\eta_r \approx$ 2.6, $N_{1,d}$ = 276 Pa, $N_{1,m}$ = 78.3 Pa, $N_{1,r}$ = 3.52, Ca ≈ 8.0, Γ = 5.84) (Cont.)

Gap (μm)	D_0 (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/D_0 (μm)	c/D_0 (μm)
1900	289.7	12634	1263.4	340.48	258.49	0.1369	1.1753	0.8923
		13187	1318.7	367.82	258.14	0.1752	1.2697	0.8911
		13751	1375.1	337.71	259.46	0.1310	1.1657	0.8956
		14328	1432.8	331.91	259.41	0.1226	1.1457	0.8954
		14918	1491.8	338.59	255.86	0.1392	1.1688	0.8832
		15508	1550.8	339.66	256.68	0.1391	1.1725	0.8860
		16096	1609.6	332.75	253.63	0.1349	1.1486	0.8755
		16716	1671.6	325.50	275.20	0.0837	1.1236	0.9499
		17360	1736	319.87	273.85	0.0775	1.1041	0.9453
		18012	1801.2	321.67	262.37	0.1015	1.1104	0.9057
		18679	1867.9	312.11	266.56	0.0787	1.0774	0.9201
		19299	1929.9	303.78	271.45	0.0562	1.0486	0.9370
		19919	1991.9	309.43	273.19	0.0622	1.0681	0.9430
		20539	2053.9	302.54	284.43	0.0309	1.0443	0.9818
		21183	2118.3	294.02	291.04	0.0051	1.0149	1.0046
		21825	2182.5	287.68	306.10	-0.0310	0.9930	1.0566
		22462	2246.2	281.86	313.48	-0.0531	0.9729	1.0821
		23069	2306.9	286.49	312.84	-0.0440	0.9889	1.0799
		23677	2367.7	286.65	313.39	-0.0446	0.9895	1.0818
		24284	2428.4	279.40	317.56	-0.0639	0.9644	1.0962
		24899	2489.9	278.63	321.91	-0.0721	0.9618	1.1112
		25500	2550	275.20	326.76	-0.0857	0.9499	1.1279
		26095	2609.5	271.88	330.41	-0.0972	0.9385	1.1405

Table B6 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.10 s^{-1}, Wi_d = 0.34, Wi_m = 0.26, $D_0 \approx$ 289.7 μm, η_d = 7,996 Pa.s, η_m = 3,026 Pa.s, $\eta_r \approx$ 2.6, $N_{1,d}$ = 276 Pa, $N_{1,m}$ = 78.3 Pa, $N_{1,r}$ = 3.52, Ca ≈ 8.0, Γ = 5.84) (Cont.)

Gap (μm)	D_0 (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/D_0 (μm)	c/D_0 (μm)
1900	289.7	26683	2668.3	272.36	333.55	-0.1010	0.9401	1.1514
		27271	2727.1	272.30	336.07	-0.1048	0.9399	1.1601
		27852	2785.2	264.69	339.47	-0.1238	0.9137	1.1718
		28440	2844	269.10	339.82	-0.1161	0.9289	1.1730
		29014	2901.4	267.08	337.99	-0.1172	0.9219	1.1667
		29585	2958.5	269.44	339.64	-0.1153	0.9301	1.1724
		30156	3015.6	265.76	341.14	-0.1242	0.9174	1.1776
		30905	3090.5	263.50	346.69	-0.1363	0.9096	1.1967
		31654	3165.4	262.77	348.53	-0.1403	0.9070	1.2031
		32393	3239.3	268.91	350.00	-0.1310	0.9282	1.2081
		33151	3315.1	259.47	352.43	-0.1519	0.8957	1.2165
		33906	3390.6	259.83	351.68	-0.1502	0.8969	1.2139
		34662	3466.2	262.95	352.15	-0.1450	0.9077	1.2156
		35433	3543.3	260.95	353.43	-0.1505	0.9008	1.2200
		36603	3660.3	260.02	354.70	-0.1540	0.8975	1.2244
		37352	3735.2	260.51	354.29	-0.1525	0.8992	1.2230
		38075	3807.5	260.30	355.91	-0.1552	0.8985	1.2285
		38726	3872.6	261.07	357.24	-0.1555	0.9012	1.2331
		39370	3937	258.96	359.44	-0.1625	0.8939	1.2407
		39974	3997.4	257.81	363.19	-0.1697	0.8899	1.2537
		40573	4057.3	255.79	364.80	-0.1757	0.8829	1.2592
		41172	4117.2	254.21	369.23	-0.1845	0.8775	1.2745
		41762	4176.2	255.41	368.95	-0.1819	0.8816	1.2736

Table B6 Raw data of the transient experiment (System A at 143 °C; $\dot{\gamma}$ = 0.10 s^{-1}, Wi_d = 0.34, Wi_m = 0.26, $D_0 \approx$ 289.7 μm, η_d = 7,996 Pa.s, η_m = 3,026 Pa.s, $\eta_r \approx$ 2.6, $N_{1,d}$ = 276 Pa, $N_{1,m}$ = 78.3 Pa, $N_{1,r}$ = 3.52, Ca ≈ 8.0, Γ = 5.84) (Cont.)

Gap (μm)	D_0 (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/D_0 (μm)	c/D_0 (μm)
1900	289.7	42351	4235.1	253.43	370.65	-0.1878	0.8748	1.2794
		42942	4294.2	253.91	369.86	-0.1859	0.8765	1.2767
		43527	4352.7	253.43	370.55	-0.1877	0.8748	1.2791
		44075	4407.5	251.85	373.18	-0.1941	0.8693	1.2882
		44584	4458.4	251.66	376.55	-0.1988	0.8687	1.2998
		45072	4507.2	250.20	379.57	-0.2054	0.8637	1.3102
		45559	4555.9	248.62	379.49	-0.2084	0.8582	1.3099
		46047	4604.7	249.54	381.97	-0.2097	0.8614	1.3185
		46538	4653.8	247.85	383.55	-0.2149	0.8555	1.3240
		47035	4703.5	247.98	384.37	-0.2157	0.8560	1.3268
		47540	4754	247.56	388.56	-0.2217	0.8545	1.3412
		48041	4804.1	245.07	388.37	-0.2262	0.8459	1.3406
		48546	4854.6	244.52	389.90	-0.2292	0.8440	1.3459
		49048	4904.8	245.52	390.75	-0.2283	0.8475	1.3488
		49559	4955.9	243.83	393.73	-0.2351	0.8417	1.3591
		50182	5018.2	243.18	393.19	-0.2357	0.8394	1.3572
		50623	5062.3	243.79	395.13	-0.2369	0.8415	1.3639
		51154	5115.4	243.85	395.47	-0.2372	0.8417	1.3651
		51686	5168.6	243.51	395.16	-0.2374	0.8406	1.3640
		52215	5221.5	243.67	395.73	-0.2378	0.8411	1.3660

Table B7 Raw data of the transient experiment (System B at 155 °C; $\dot{\gamma}$ = 0.63 s^{-1}, Wi_d = 0.28, Wi_m = 0.71, $D_0 \approx$ 68.8 μm, η_d = 964.2 Pa.s, η_m = 2013.8 Pa.s, $\eta_r \approx$ 0.5, $N_{1,d}$ = 168.8 Pa, $N_{1,m}$ = 920.6 Pa, $N_{1,r}$ = 0.18, Ca ≈ 8.0, Γ = 5.60)

Gap (μm)	D_0 (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/D_0	c/D_0
1950	72.2	70	44.1	77.63	73.43	0.0278	1.1349	1.0735
		141	88.8	72.58	82.45	-0.0637	1.0611	1.2054
		212	133.6	71.54	88.62	-0.1066	1.0459	1.2956
		283	178.3	70.60	90.47	-0.1234	1.0322	1.3227
		354	223.0	73.14	89.31	-0.0995	1.0693	1.3057
		425	267.8	76.85	86.25	-0.0576	1.1235	1.2610
		495	311.9	77.24	80.37	-0.0199	1.1292	1.1750
		566	356.6	78.91	72.90	0.0396	1.1537	1.0658
		637	401.3	82.32	68.23	0.0936	1.2035	0.9975
		708	446.0	85.27	67.36	0.1173	1.2466	0.9848
		779	490.8	84.32	66.09	0.1212	1.2327	0.9662
		850	535.5	85.67	64.44	0.1414	1.2525	0.9421
		921	580.2	85.52	62.09	0.1587	1.2503	0.9077
		992	625.0	84.75	63.07	0.1467	1.2390	0.9221
		1063	669.7	82.60	64.87	0.1202	1.2076	0.9484
		1133	713.8	83.51	65.16	0.1234	1.2209	0.9526
		1203	757.9	82.68	67.72	0.0995	1.2088	0.9901
		1272	801.4	80.48	68.21	0.0825	1.1766	0.9972
		1341	844.8	77.61	69.43	0.0556	1.1346	1.0151
		1410	888.3	77.95	70.93	0.0472	1.1396	1.0370
		1479	931.8	76.53	72.07	0.0300	1.1189	1.0537
		1548	975.2	75.35	72.04	0.0225	1.1016	1.0532
		1616	1018.1	75.10	73.22	0.0127	1.0980	1.0705

Table B7 Raw data of the transient experiment (System B at 155 °C; $\dot{\gamma}$ = 0.63 s^{-1}, Wi_d = 0.28, Wi_m = 0.71, $D_0 \approx$ 68.8 μm, η_d = 964.2 Pa.s, η_m = 2013.8 Pa.s, $\eta_r \approx$ 0.5, $N_{1,d}$ = 168.8 Pa, $N_{1,m}$ = 920.6 Pa, $N_{1,r}$ = 0.18, Ca ≈ 8.0, Γ = 5.60) (Cont.)

Gap (μm)	D_0 (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/D_0	c/D_0
1950	72.2	1684	1060.9	73.86	74.68	-0.0055	1.0798	1.0918
		1752	1103.8	71.73	75.68	-0.0268	1.0487	1.1064
		1820	1146.6	72.61	76.02	-0.0229	1.0615	1.1114
		1888	1189.4	71.32	76.54	-0.0353	1.0427	1.1190
		1956	1232.3	69.18	78.65	-0.0641	1.0114	1.1499
		2023	1274.5	69.27	78.68	-0.0636	1.0127	1.1503
		2090	1316.7	68.55	79.89	-0.0764	1.0022	1.1680
		2157	1358.9	68.21	80.35	-0.0817	0.9972	1.1747
		2224	1401.1	68.27	81.11	-0.0860	0.9981	1.1858
		2291	1443.3	67.70	80.64	-0.0872	0.9898	1.1789
		2357	1484.9	68.14	80.50	-0.0832	0.9962	1.1769
		2424	1527.1	66.70	81.19	-0.0980	0.9751	1.1870
		2491	1569.3	67.50	80.81	-0.0897	0.9868	1.1814
		2557	1610.9	67.28	81.59	-0.0961	0.9836	1.1928
		2623	1652.5	67.00	81.74	-0.0991	0.9795	1.1950
		2689	1694.1	66.61	80.84	-0.0965	0.9738	1.1819
		2755	1735.7	66.89	81.15	-0.0963	0.9779	1.1864
		2821	1777.2	67.78	81.70	-0.0931	0.9909	1.1944
		2953	1860.4	66.89	81.93	-0.1011	0.9779	1.1978
		3018	1901.3	66.32	82.45	-0.1084	0.9696	1.2054
		3082	1941.7	67.26	83.31	-0.1066	0.9833	1.2180
		3147	1982.6	66.78	81.75	-0.1008	0.9763	1.1952
		3212	2023.6	66.41	82.60	-0.1087	0.9709	1.2076

Table B7 Raw data of the transient experiment (System B at 155 °C; $\dot{\gamma}$ = 0.63 s^{-1}, Wi_d = 0.28, Wi_m = 0.71, $D_0 \approx$ 68.8 μm, η_d = 964.2 Pa.s, η_m = 2013.8 Pa.s, $\eta_r \approx$ 0.5, $N_{1,d}$ = 168.8 Pa, $N_{1,m}$ = 920.6 Pa, $N_{1,r}$ = 0.18, Ca ≈ 8.0, Γ = 5.60) (Cont.)

Gap (μm)	D_0 (μm)	Time (s)	Strain	a* (μm)	c (μm)	Def*	a*/D_0	c/D_0
1950	72.2	3277	2064.5	65.76	82.95	-0.1156	0.9614	1.2127
		3342	2105.5	66.07	82.09	-0.1081	0.9659	1.2001
		3407	2146.4	65.87	81.95	-0.1088	0.9630	1.1981
		3471	2186.7	66.43	82.70	-0.1091	0.9712	1.2091
		3534	2226.4	65.70	82.42	-0.1129	0.9605	1.2050
		3598	2266.7	66.31	82.33	-0.1078	0.9694	1.2037
		3661	2306.4	65.75	82.49	-0.1129	0.9613	1.2060
		3724	2346.1	66.09	82.92	-0.1129	0.9662	1.2123
		3787	2385.8	65.54	82.49	-0.1145	0.9582	1.2060
		3913	2465.2	65.74	83.97	-0.1218	0.9611	1.2276
		3975	2504.3	64.59	82.89	-0.1241	0.9443	1.2118
		4037	2543.3	65.22	83.64	-0.1327	0.9535	1.2228
		4098	2581.7	64.60	82.87	-0.1239	0.9444	1.2115
		4160	2620.8	65.14	83.46	-0.1233	0.9523	1.2202
		4221	2659.2	65.06	83.37	-0.1234	0.9512	1.2189
		4283	2698.3	64.76	83.75	-0.1279	0.9468	1.2244

Appendix C Steady-State Deformation and Breakup experiments

The sample was loaded into the flow cell, droplet was left to relax to form spherical shapes for a period of at least 70 min; this was a little longer than the duration of the transient experiment because some droplets used here were larger. The steady-state shearing mode was used, steady-state shapes of isolated droplets below the critical capillary number for droplet breakup were determined. The critical capillary number was determined by imposing successive changes of initial droplet size from small droplet size to larger droplet size at a fixed shearing rate at 0.4 s^{-1} for system A and system C and a fixed shearing rate at 0.63 s^{-1} for system B until the drop breakup was observed. To determine the steady-state droplet shape as a function of capillary number, the required strain to reach steady-state droplet shape depended on droplet size which increased with the droplet size. From the transient experiment, the required strain to reach steady-state droplet shape was determined and found to be around 4000 strain, at Ca = 8 and D_0 = 85 (± 5μm) . Therefore a constant shear rate was then applied until a strain exceeding 4,000 strain units was attained. To ensure that the steady-state deformation had been attained, when a selected droplet passed through the viewing window, the droplet was imaged over a period of 5 to 10 min and we measured Def* until its value became constant. After that, flow was stopped and the droplet shape relaxation was recorded with the CCD camera at speeds of 10-20 second per frame for approximately 90 minutes.

For droplets in which no steady-state shape was obtained, the unstable shapes of the droplets were recorded with time until the droplets were broken. The breakup processes for system A were achieved by keeping capillary number fixed at 11 using shear rates of 0.40 s^{-1}; for system B capillary number was fixed at 9.5 and shear rates were 0.20, 0.63 s^{-1}.

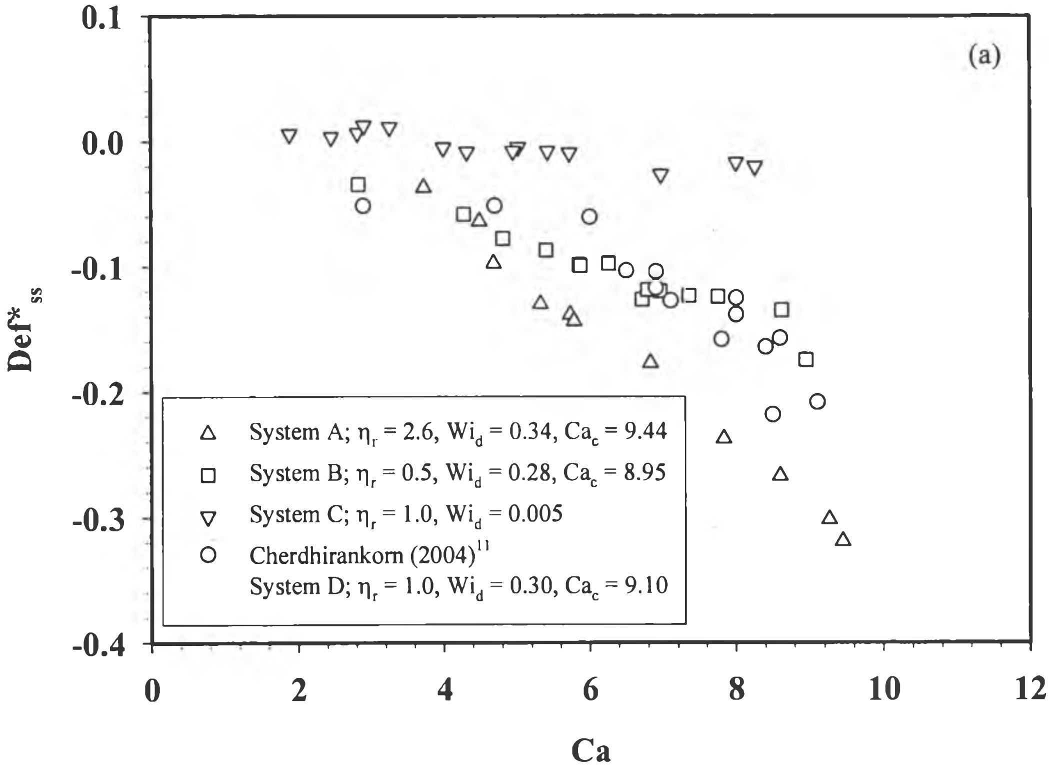


Figure C1a Steady-state deformation vs. Ca: $Wi_d \approx 0.30$: system A $\eta_r = 2.6$ at shear rate of 0.4 s^{-1}, (△); system D of Cherdhirankorn et al. (2004)[11] $\eta_r = 1.0$ at shear rate of 0.5 s^{-1}, (O); system B $\eta_r = 0.5$ at shear rate of 0.63 s^{-1}, (□); system C, Wi_d = 0.005, $\eta_r = 1.0$ at shear rate of 0.4 s^{-1}, (▽), Ca is varied by varying droplet size.

Table C1 Critical capillary number, Ca_c, for each system

System	Shear rate (s^{-1})	η_r	Wi_d	Ca_c
A	0.10	2.6	0.34	9.44
B	0.63	0.5	0.28	8.95
C	0.40	1.0	<0.005	-
D	0.50	1.0	0.30	9.10

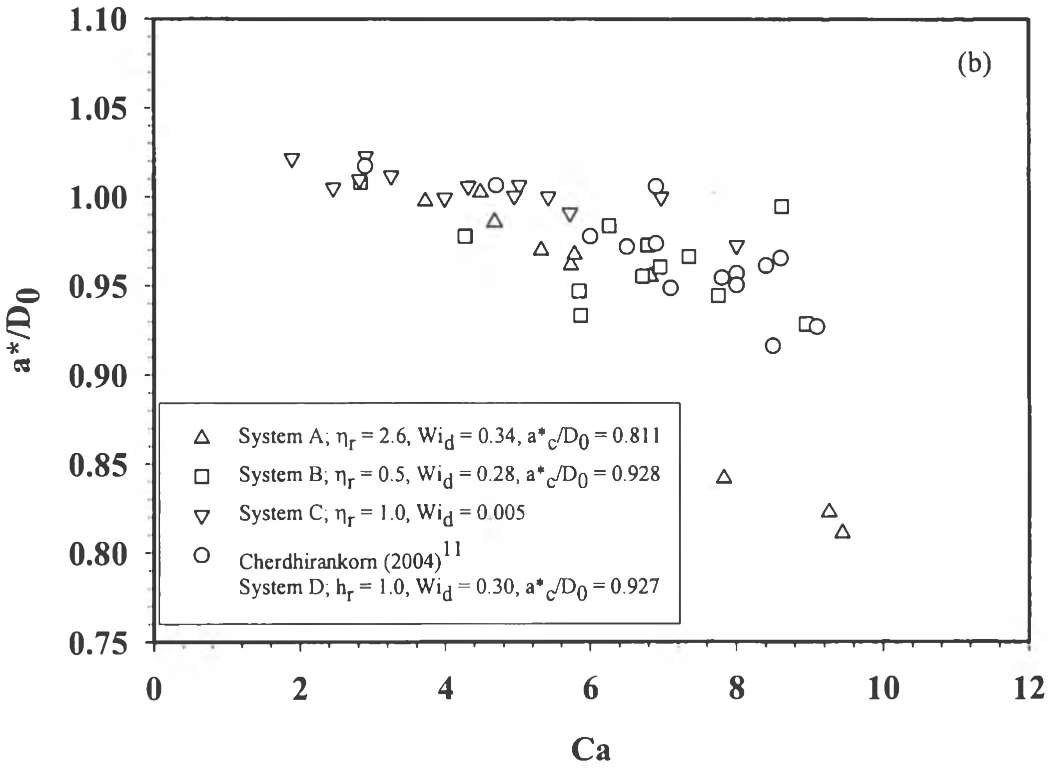


Figure C1b a^*/D_0 vs. Ca: $Wi_d \approx 0.30$: system A $\eta_r = 2.6$ at shear rate of 0.4 s^{-1}, (△); system D of Cherdhirankorn et al. (2004)[11] $\eta_r = 1.0$ at shear rate of 0.5 s^{-1}, (O); system B $\eta_r = 0.5$ at shear rate of 0.63 s^{-1}, (□); system C, $Wi_d = 0.005$, $\eta_r = 1.0$ at shear rate of 0.4 s^{-1}, (▽), Ca is varied by varying droplet size.

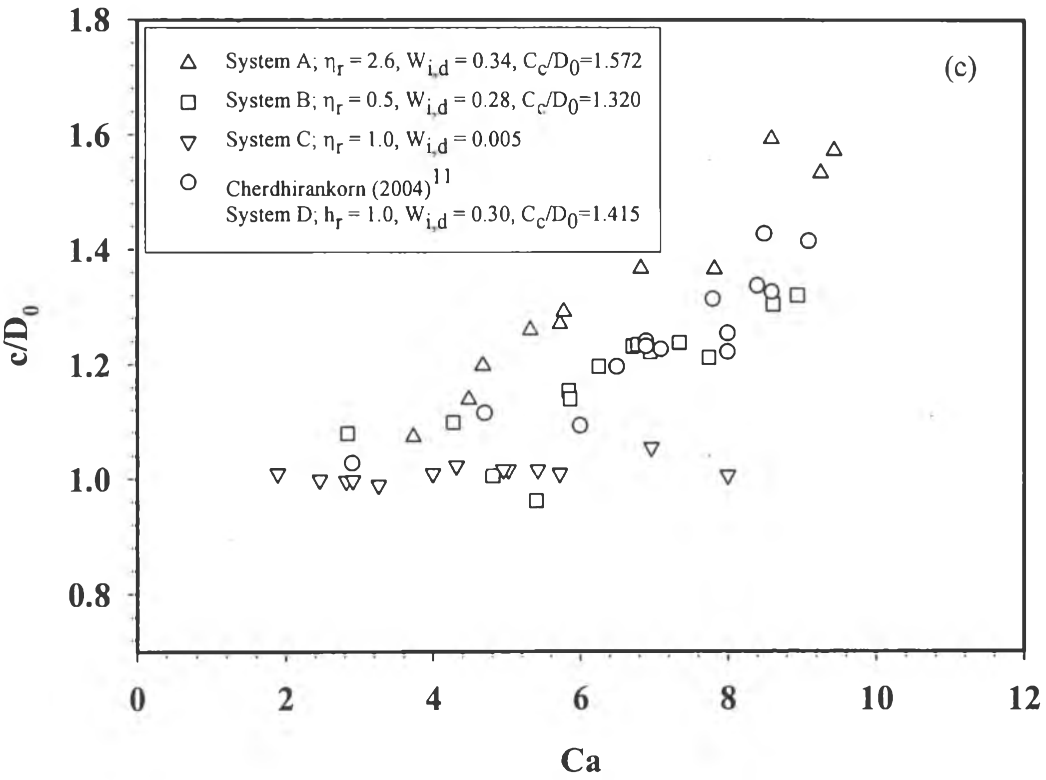


Figure C1c c/D_0 vs. Ca: $Wi_d \approx 0.30$: system A $\eta_r = 2.6$ at shear rate of 0.4 s^{-1}, (△); system D of Cherdhirankorn et al. (2004)[11] $\eta_r = 1.0$ at shear rate of 0.5 s^{-1}, (O); system B $\eta_r = 0.5$ at shear rate of 0.63 s^{-1}, (□); system C, $Wi_d = 0.005$, $\eta_r = 1.0$ at shear rate of 0.4 s^{-1}, (▽), Ca is varied by varying droplet size.

Raw Data in Steady State Experiments

Table C2 Raw data of steady state experiment; System A at 143 °C $\dot{\gamma} = 0.1\ s^{-1}$, $Wi_d = 0.34$, $Wi_m = 0.26$, $\eta_d = 7{,}996$ Pa.s, $\eta_m = 3{,}026$ Pa.s, $\eta_r \approx 2.6$, $N_{1,d} = 276$ Pa, $N_{1,m} = 78.3$ Pa, $N_{1,r} = 3.52$, $\Gamma = 5.84$ mN/m

Test	Time (min)	Gap (μm)	Do (μm)	Ca	a* (μm)	c (μm)	Def^*_{ss}	a*/Do	c/Do
1	900	2120	342.9	9.26	282.11	525.58	-0.3014	0.8228	1.5328
2	840	2370	212.1	5.73	203.93	269.31	-0.1382	0.9617	1.2700
3	855	2250	214.0	5.78	207.09	276.38	-0.1433	0.9676	1.2914
4	855	2250	252.7	6.83	241.39	345.16	-0.1769	0.9554	1.3661
5	860	2310	289.7	7.83	243.85	395.47	-0.2372	0.8417	1.3651
6	840	2280	138.1	3.73	137.76	148.19	-0.0365	0.9975	1.0731
7	840	2280	166.2	4.49	166.63	189.23	-0.0635	1.0026	1.1386
8	750	2300	173.2	4.68	170.72	207.4	-0.097	0.9856	1.1974
9	750	2300	197.0	5.32	191.06	248.05	-0.1298	0.9698	1.2591
10	820	2150	349.5	9.44	283.39	549.29	-0.3193	0.8108	1.5716
11	890	2350	318.2	8.60	293.16	506.71	-0.267	0.9213	1.5924

Table C3 Raw data of steady state experiment; System B at 155 °C , $\dot{\gamma}$ = 0.63 s^{-1}, Wi_d = 0.28, Wi_m = 0.71, η_d = 964.2 Pa.s, η_m = 2013.8 Pa.s, $\eta_r \approx 0.5$, $N_{1,d}$ = 168.8 Pa, $N_{1,m}$ = 920.6 Pa, $N_{1,r}$ = 0.18, Γ = 5.60 mN/m

Test	Time (min)	Gap (μm)	Do (μm)	Ca	a* (μm)	c (μm)	Def^*_{ss}	a*/Do	c/Do
1	105	2250	25.1	2.84	25.30	27.08	-0.0340	1.0080	1.0789
2	105	2250	37.8	4.28	36.96	41.51	-0.0580	0.9778	1.0981
3	105	2250	51.6	5.85	48.87	59.54	-0.0984	0.9471	1.1539
4	101	2280	51.8	5.87	48.35	58.99	-0.0991	0.9334	1.1388
5	107	2200	59.3	6.72	56.65	73.01	-0.1262	0.9553	1.2312
6	107	2200	55.3	6.26	54.39	66.13	-0.0974	0.9835	1.1958
7	105	2300	47.7	5.40	54.58	45.88	-0.0866	1.1442	0.9618
8	115	2390	42.5	4.81	49.87	42.70	-0.0775	1.1734	1.0047
9	66	1950	68.4	7.75	64.60	82.87	-0.1239	0.9444	1.2115
10	120	2350	61.4	6.96	58.97	74.97	-0.1195	0.9604	1.2210
11	120	2350	64.9	7.35	62.72	80.31	-0.1230	0.9664	1.2374
12	120	2350	76.1	8.62	75.68	99.22	-0.1346	0.9945	1.3038
13	77	2450	59.9	6.79	58.27	73.90	-0.1183	0.9728	1.2337
14	72	2150	79.0	8.95	73.37	104.26	-0.1745	0.9287	1.3197

Table C4 Raw data of steady state experiment; System C at 139 °C , $\dot{\gamma}$ = 0.40 s^{-1}, $Wi_d \approx 0.005$, $Wi_m \approx 0.005$, η_d = 630.0 Pa.s, η_m = 595.0 Pa.s, $\eta_r \approx 1.0$, G'_d < 1.3 Pa, G'_m < 1.3 Pa, G'_r = 1.00, Γ = 5.92 mN/m

Test	Time (min)	Gap (μm)	Do (μm)	Ca	a* (μm)	c (μm)	Def^*_{ss}	a*/Do	c/Do
1	212	2100	284.4	5.72	281.77	286.97	-0.0091	0.9908	1.0090
2	213	2100	398.3	8.00	387.4	400.61	-0.0168	0.9726	1.0058
3	215	2100	250.0	5.02	251.61	253.92	-0.0046	1.0064	1.0157
4	218	2100	511.1	8.26	407.05	423.62	-0.0199	0.7964	0.8288
5	224	2120	246.6	4.95	246.69	250.46	-0.0076	1.0004	1.0157
6	224	2120	94.2	1.89	96.23	95.08	0.0060	1.0215	1.0093
7	225	2120	269.5	5.42	269.45	273.67	-0.0078	0.9998	1.0155
8	225	2120	140.2	2.82	141.55	139.64	0.0068	1.0096	0.9960
9	226	2120	144.6	2.91	147.88	144.17	0.0127	1.0227	0.9970
10	227	2120	122.5	2.46	123.11	122.25	0.0035	1.0050	0.9980
11	229	1980	215.1	4.32	216.36	219.93	-0.0082	1.0059	1.0225
12	231	1980	347.2	6.97	347.12	365.8	-0.0262	0.9998	1.0536
13	235	1980	198.9	4.00	198.75	200.72	-0.0049	0.9992	1.0092
14	243	1980	162.2	3.26	164.1	160.42	0.0113	1.0117	0.9890

Appendix D Rheological Data

Table D1 Properties of polymer blend components

Polymer	Suppliers	Grade	M_w*	Melt Flow Index (g/10min)
PS1	Polyscience	Cat#18544	62,000	-
PS2	Polyscience	Cat#23637	67,000	-
HDPE1	Bangkok Polyethylene	1600J	68,000	14
HDPE2	Aldrich	Cat#42801-9	-	42

* Quoted by the manufacturers

Table D.2 Polymer blend systems

Blend System	Blend Component Drop/Matrix	Temperature (C°)	Viscosity ratio	Shear rate (s^{-1})
A	PS2/HDPE1	143	2.6	0.17-0.63
B	PS1/HDPE1	155	0.5	0.20-0.63
Cherdhirankorn (2003), System A	PS1/HDPE1	147	1.0	0.28-0.80
Cherdhirankorn (2003), System B	PS2/HDPE2	139	1.0	1.0

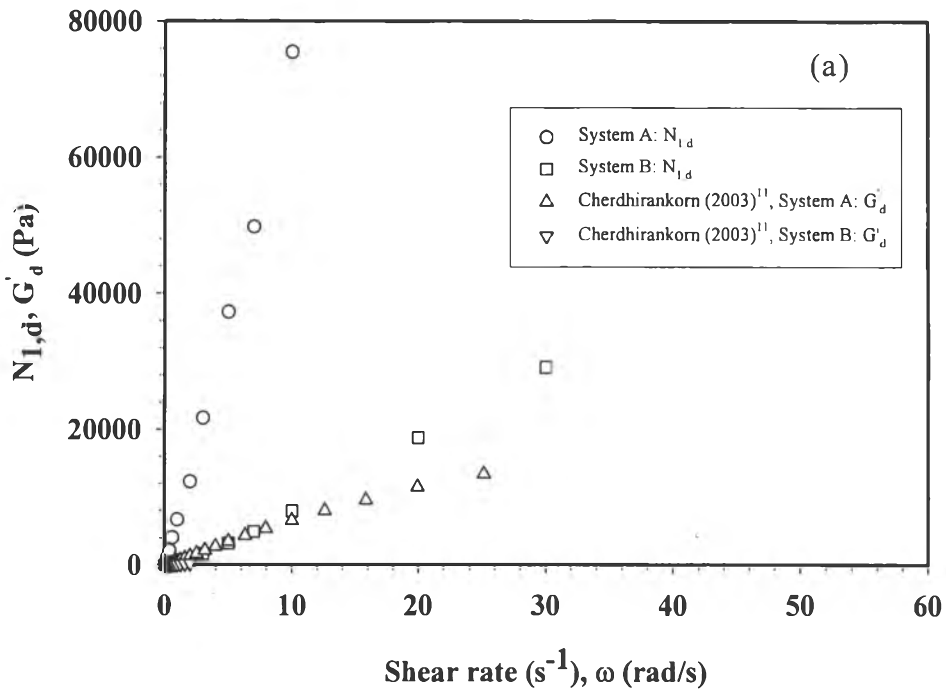


Figure D1a First normal stress difference N_1, and storage modulus G' as functions of shear rate and frequency plot scale on x axis from 0 to 60 for dispersed-phase.

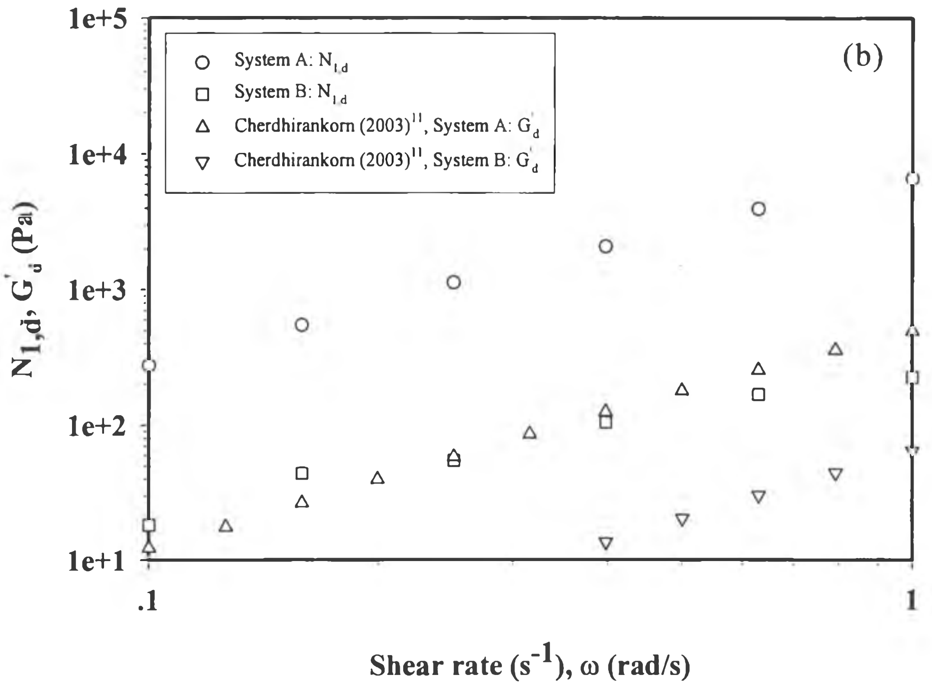


Figure D1b First normal stress difference N_1, and storage modulus G' as functions of shear rate and frequency plot scale on x axis from 0.1 to 1.0 for dispersed-phase.

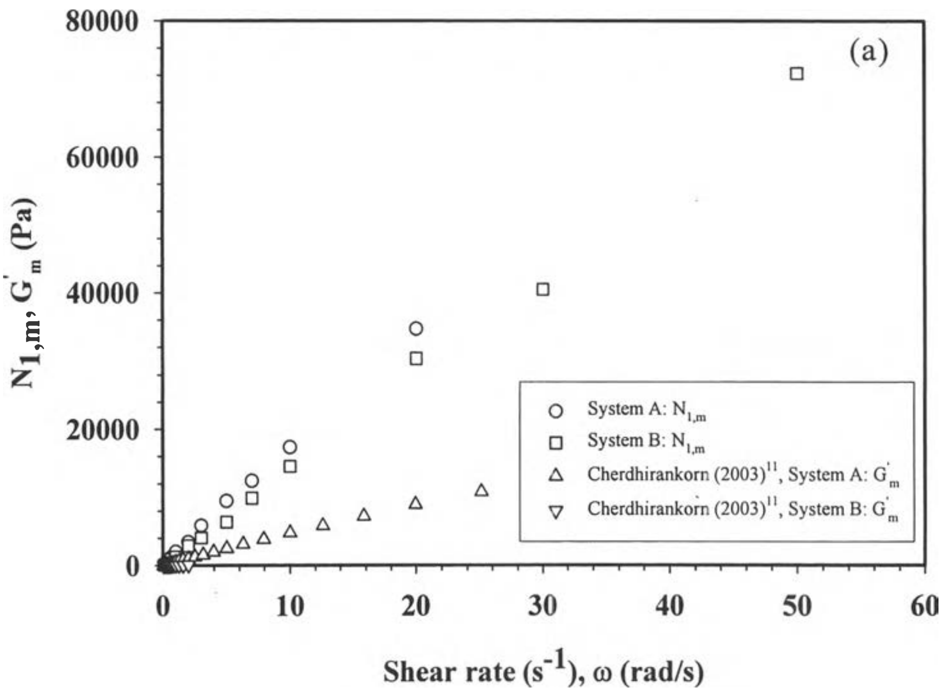


Figure D2a First normal stress difference N_1, and storage modulus G' as functions of shear rate and frequency ploted scale on x axis from 0 to 60 for matrix phase.

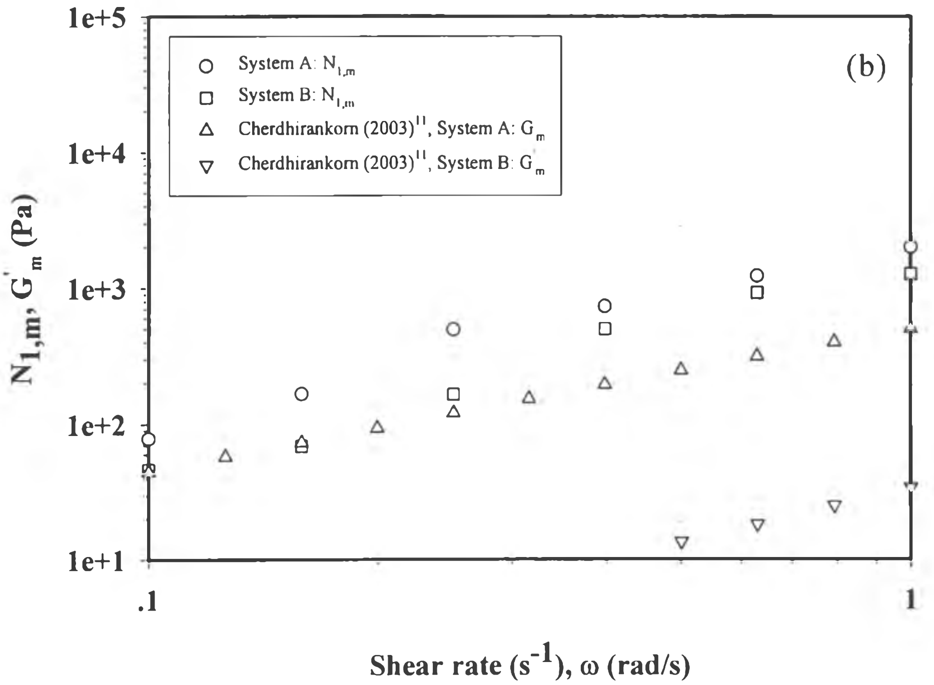


Figure D2b First normal stress difference N_1, and storage modulus G' as functions of shear rate and frequency ploted scale on x axis from 0.1 to 1.0 for matrix phase.

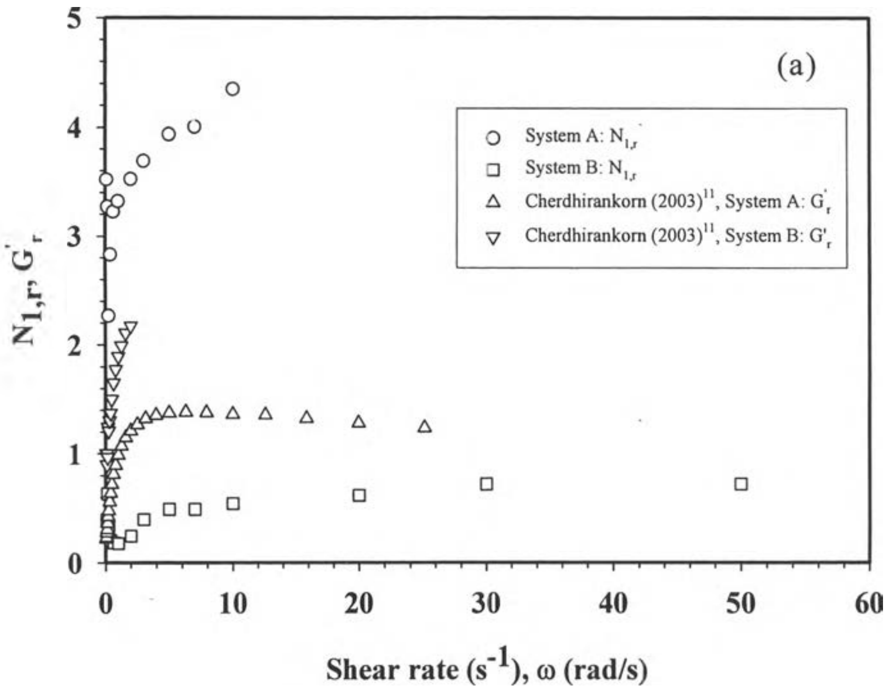


Figure D3a First normal stress difference ratio $N_{1,r}$, and storage modulus ratio G'_r as functions of shear rate and frequency ploted scale on x axis from 0 to 60.

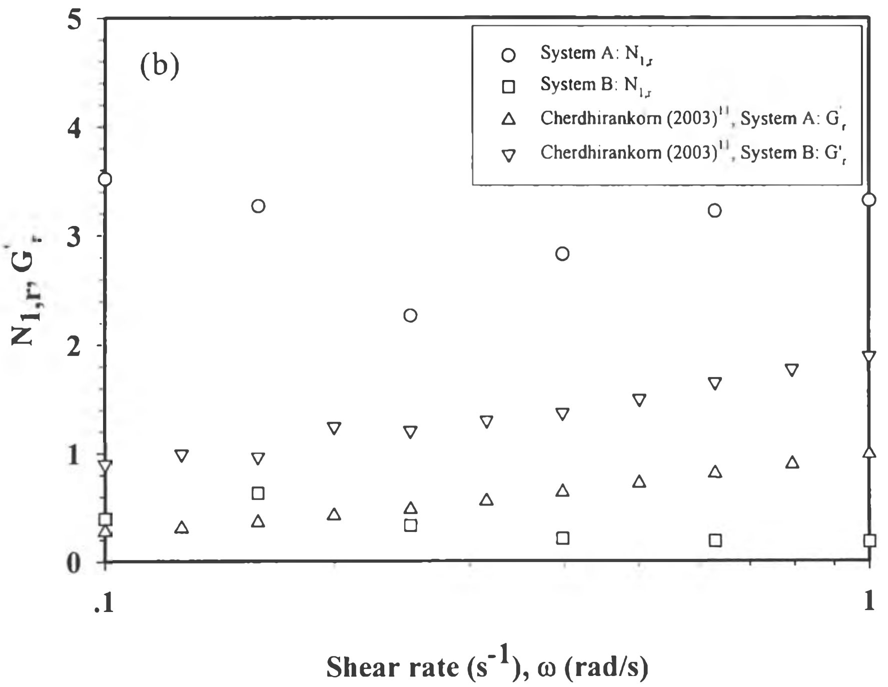


Figure D3b First normal stress difference ratio $N_{1,r}$, and storage modulus ratio G'_r as functions of shear rate and frequency ploted scale on x axis from 0.1 to 1.0.

Appendix E Breakup Sequences

The sample was loaded into the flow cell, a droplet was left to relax to from spherical shapes for a period of at least 70 min. The deformed shape of the droplet was observed as a function of time from the initial instance until breakup occurred. To clearly obtain droplet images, we stopped the flow each time the droplet reached the viewing window for a duration less than 1 second; this was a very short time for droplet to relax its shape, and we recorded time while flow was stopped. The time for one cycle of a droplet was recorded with a stopwatch along with the time shown on the Linksys program. Then the flow was imposed again until the droplet passed through the viewing window again. By repeating the experiment on various droplets,, we obtained the breakup sequence from the initial time until the breakup time. The breakup processes for system A were achieved by keeping Capillary number at 11 using shear rate of 0.17, 0.4 s^{-1}. For system B, capillary number was fixed at 9.5 and the shear rates were of 0.20,0.63 s^{-1}.

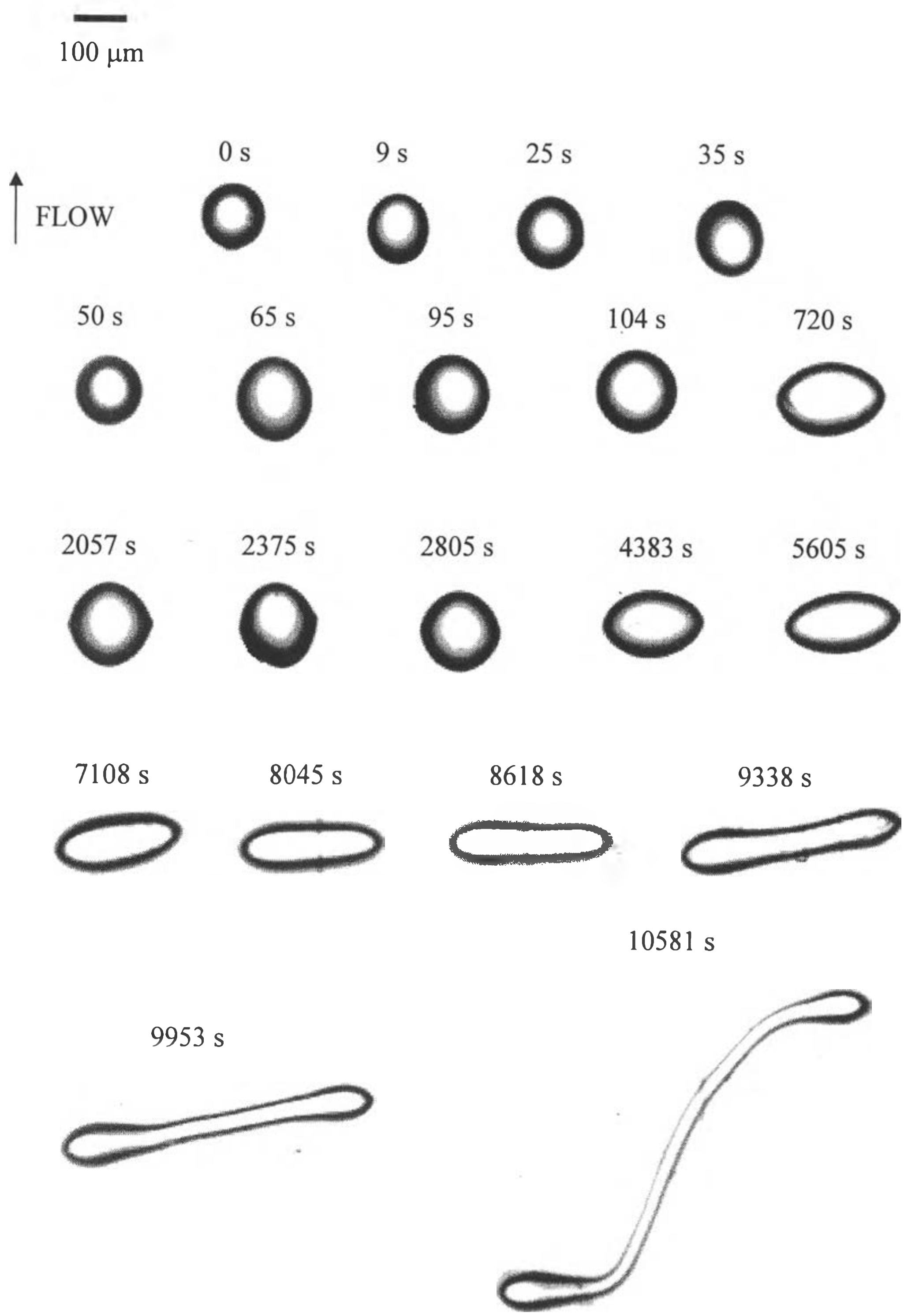


Figure E1 Sequence of images during droplet breakup of system A at a shear rate of 0.4 s^{-1}, D_0 = 125 (±7) μm, Wi_d = 0.75, Wi_m = 0.71 for η_r = 2.6, Ca = 11.

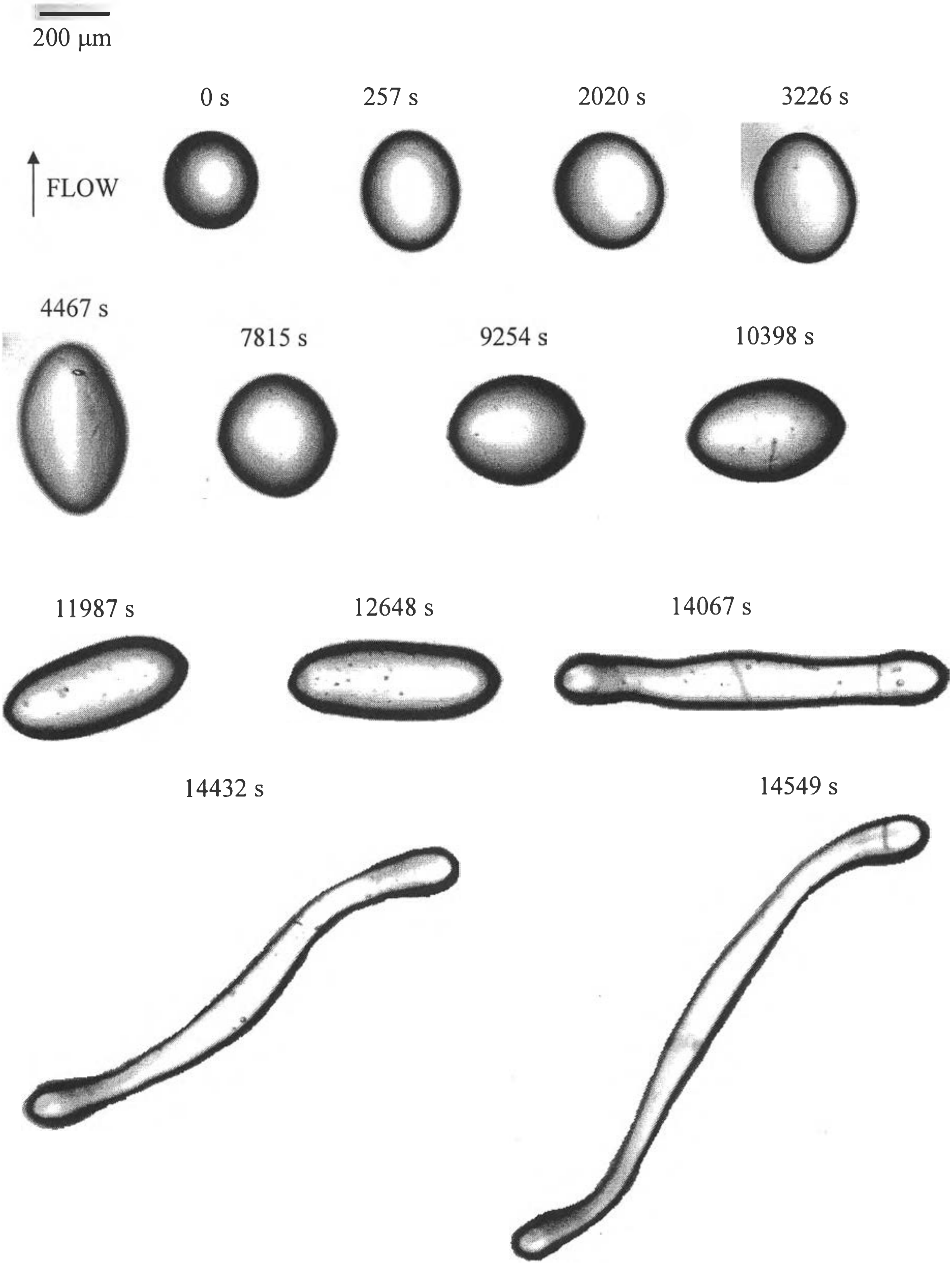


Figure E2 Sequence of images during droplet breakup of system A at a shear rate of $0.17\ s^{-1}$, $D_0 = 262.3\ \mu m$, $Wi_d = 0.45$, $Wi_m = 0.43$ for $\eta_r = 2.6$, $Ca = 11$.

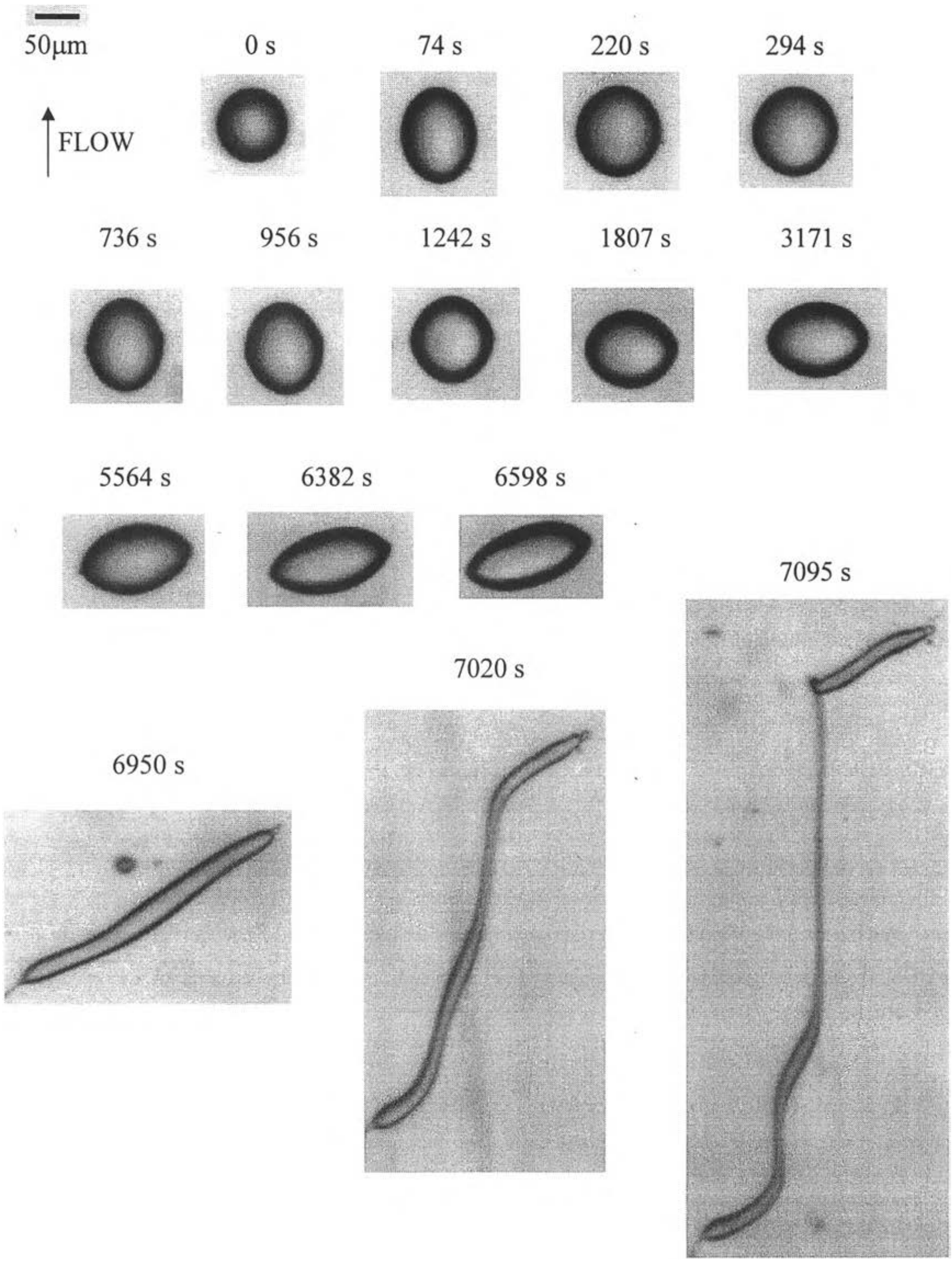


Figure E3 Sequence of images during droplet breakup of system Bat a shear rate of $0.63\ s^{-1}$, $D_0 = 81.6\ \mu m$, $Wi_d = 0.28$, $Wi_m = 0.72$ for $\eta_r = 0.5$, $Ca = 9.5$.

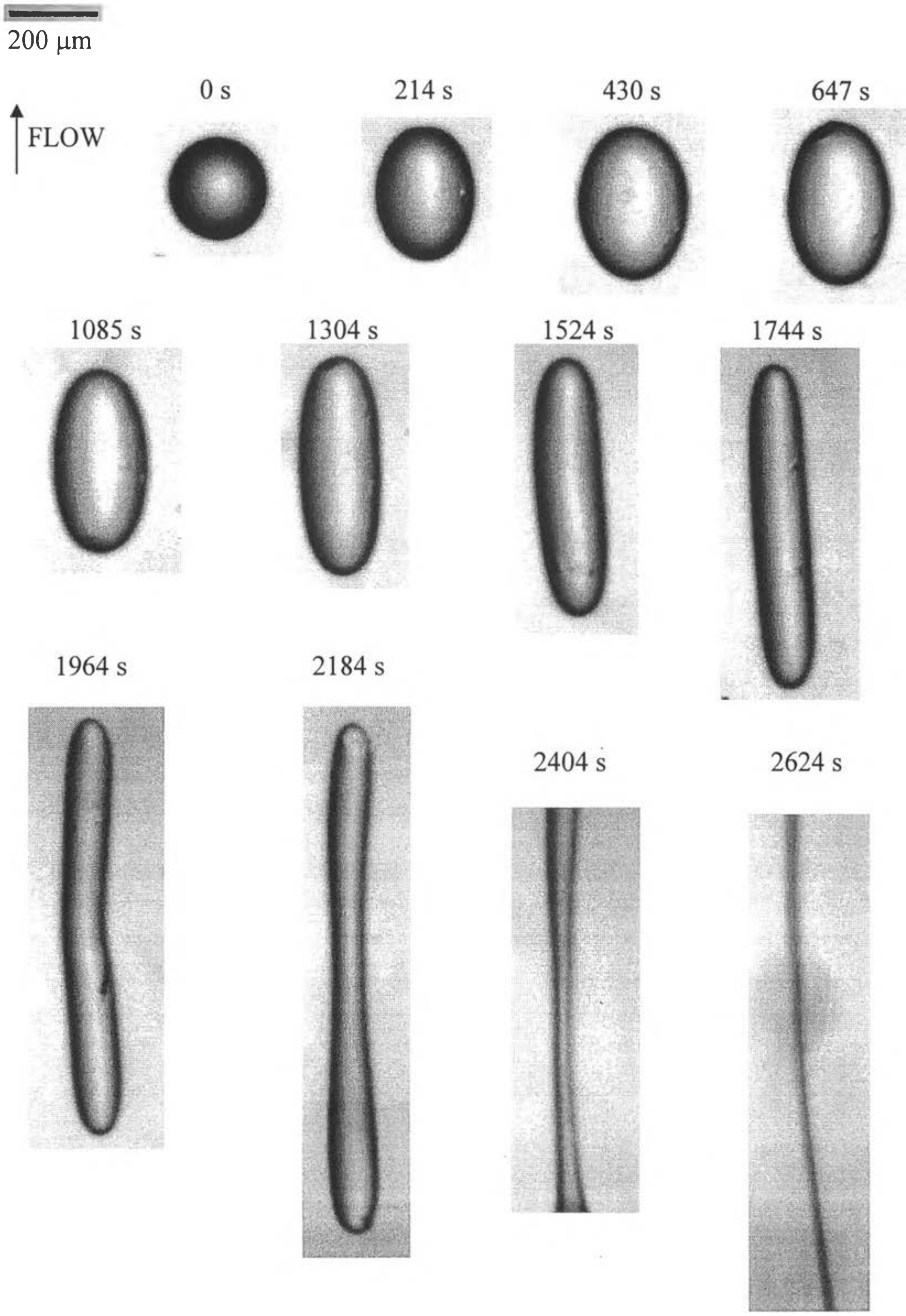


Figure E4 Sequence of images during droplet breakup of system B at a shear rate of 0.20 s^{-1} , D_0 = 225.3 μm, Wi_d = 0.25,Wi_m = 0.24 for η_r = 0.5, Ca = 9.5.

Appendix F Relaxation after Cessation of Steady Shear

The sample was inserted into the flow cell, droplet was left to relax to form a spherical shape for a period of at least 70 min. The droplet was imposed with a shear flow continuously at 0.4 s^{-1} for system A, and at 0.63 s^{-1} for system B until the steady-state deformation was attained. Then the flow was stopped and the droplet shape relaxation was recorded with a CCD camera at a speed of 1 frame per 10-20 seconds for approximately 90 minutes. Figures F1 (a) and (b) show the relaxation of Def* normalized by its steady-state value Def^*_{ss} after cessation of steady shearing at the shear rate of 0.4 s^{-1} and 0.63 s^{-1} respectively, of vaiours droplet sizes (and hence different capillary numbers). The logarithm of Def^*/Def^*_{ss} first decreases linearly with time, gradually changing to a nonlinear relaxation at long times. Since the initial decay of ln $[Def^*/Def^*_{ss}]$ is linear, we can write

$$\frac{Def^*}{Def^*_{ss}} = e^{-t/\tau} \qquad \text{(F1)}$$

where τ is the droplet relaxation time after cessation of steady shear. Figure F2 plots τ vs. Ca at shear rate of 0.4 s^{-1} for system A, and 0.63 s^{-1} for system B. The relaxation time increases roughly linearly with capillary number. We also note that τ of system A is greater than system B. It can be noted that the viscosity ratio (η_r) of system A (2.6) is greater than System B (0.5). At a fixed capillary number, the droplet subjected to a greater viscosity ratio relaxes faster.

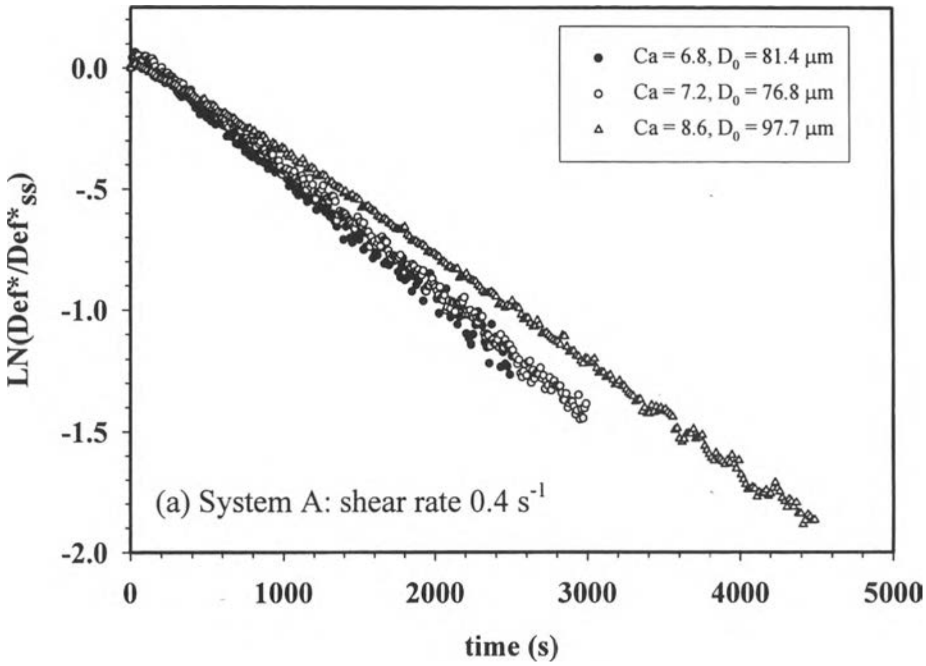


Figure F1a Recovery of Def* normalized by its steady-state values Def^*_{ss} after cessation of steady-state shearof system A $\eta_r = 2.6$, $Wi_d = 0.75$, at shear rate of 0.4 s^{-1}.

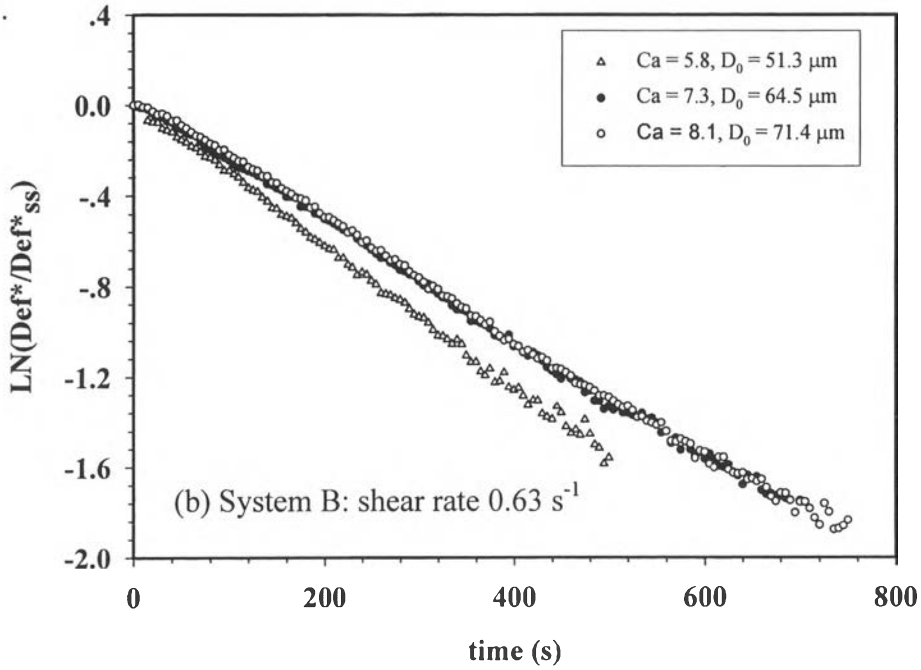


Figure F1b Recovery of Def* normalized by its steady-state values Def^*_{ss} after cessation of steady-state shear of system B $\eta_r = 0.5$, $Wi_d = 0.75$, at shear rate of 0.63 s^{-1}.

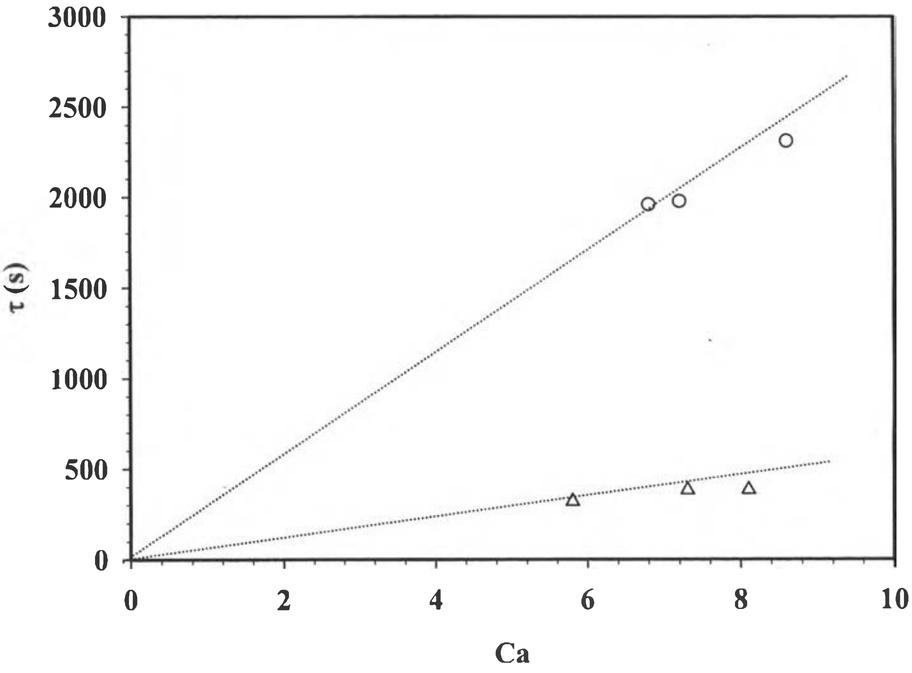


Figure F2 Dependence of the characteristic relaxation time at $Wi_d = 0.75$: system A, η_r=2.6 at shear rate of 0.4 s^{-1}, (○); and for system B, η_r= 0.5 at shear rate of 0.63 s^{-1}, (△).

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