Electronic Supplementary Material (ESI) for Soft Matter.

Supporting Information

Can small air bubbles probe very low frother concentration faster?

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Table S1. Terminal velocities U_t and *Re* for each of the studied systems.

MIBC				DowFroth 250			
c	*D* (μm)	U_t (mm·s^{-1})	*Re*	*c*	*D* (μm)	U_t (mm·s^{-1})	*Re*
1ppm (1×10^{-5} mol·L^{-1})	506±2	74.7±1.0	35.8	**0.1ppm (3.8×10^{-7} mol·L^{-1})**	505±2	63.0±0.3	30.1
	488±3	71.6±1.2	33.1		490±2	60.8±0.4	28.2
	432±1	57.4±0.2	23.5		430±1	50.1±0.3	20.4
	414±2	56.0±0.8	21.9		415±1	48.5±0.2	19.1
	336±1	36.3±0.7	11.5		334±1	36.4±0.1	11.5
	250±2	23.4±0.1	5.5		250±1	23.5±0.1	5.6
5ppm (5×10^{-5} mol·L^{-1})	504±2	63.2±1.2	30.1	**0.5ppm (1.9×10^{-6} mol·L^{-1})**	506±1	57.7±0.2	27.6
	488±1	61.0±1.2	28.2		492±1	55.7±0.1	25.9
	429±2	49.9±0.4	20.2		431±1	47.8±0.2	19.4
	413±1	48.9±0.5	19.0		416±2	46.3±0.3	18.3
	335±2	34.9±0.5	11.1		334±1	35.2±0.1	11.1
	249±3	22.8±0.1	5.4		252±1	23.0±0.2	5.5
10ppm (1×10^{-4} mol·L^{-1})	504±2	60.0±0.5	28.6	**1ppm (3.8×10^{-6} mol·L^{-1})**	505±2	56.8±0.1	27.1
	489±2	57.7±0.8	26.7		490±1	54.8±0.4	25.4
	429±1	46.9±0.2	19.1		430±1	47.2±0.4	19.2
	415±2	46.2±0.5	18.1		415±3	45.9±0.4	18.0
	337±2	34.5±0.3	11.0		335±1	34.9±0.2	11.1
	248±2	22.4±0.1	5.2		251±2	22.7±0.1	5.4
50ppm (5×10^{-4} mol·L^{-1})	506±1	56.2±0.6	26.9	**2ppm (7.6×10^{-6} mol·L^{-1})**	505±1	56.4±0.2	26.9
	488±3	53.8±1.0	24.9		491±1	54.4±0.2	25.2
	430±1	46.0±0.2	18.7		430±2	46.8±0.1	19.1
	416±3	44.6±0.3	17.6		414±1	45.5±0.1	17.8
	337±1	33.6±0.1	10.7		335±2	34.6±0.2	11.0
	250±1	22.2±0.1	5.1		252±2	22.4±0.2	5.3
100ppm (1×10^{-3} mol·L^{-1})	505±2	55.9±0.4	26.7	**5ppm (1.9×10^{-5} mol·L^{-1})**	506±1	55.0±0.2	26.8
	490±2	53.5±1.1	24.6		489±2	53.8±0.1	24.9
	431±1	45.3±0.1	18.4		431±1	46.4±0.1	18.9
	413±2	43.8±0.2	17.1		414±1	44.9±0.2	17.6
	334±1	33.4±0.2	10.5		334±2	34.2±0.2	10.8
	248±2	22.1±0.1	5.1		251±1	22.2±0.1	5.2

Table S2. Mobility percentage for each of the studied systems.

MIBC			**DowFroth 250**		
	D (μm)	M_p (%)		D (μm)	M_p (%)
c = 1ppm (1×10^{-5} mol·L^{-1}) **γ = 72.3 mN·m^{-1}** **θ = 0.20 %**	506±2	50.7	**c = 0.1ppm (3.8×10^{-7} mol·L^{-1})** **γ = 72.3 mN·m^{-1}** **θ = 1.09 %**	505±2	21.4
	488±3	50.3		490±2	21.5
	432±1	43.4		430±1	16.8
	414±2	44.1		415±1	16.3
	336±1	16.8		334±1	15.5
	250±2	12.5		250±1	13.4
c = 5ppm (5×10^{-5} mol·L^{-1}) **γ = 72.0 mN·m^{-1}** **θ = 1.02 %**	504±2	22.0	**c = 0.5ppm (1.9×10^{-6} mol·L^{-1})** **γ = 72.0 mN·m^{-1}** **θ = 5.17 %**	506±1	8.1
	488±1	22.2		492±1	8.0
	429±2	17.3		431±1	8.3
	413±1	17.5		416±2	8.1
	335±2	8.8		334±1	6.5
	249±3	7.0		252±1	4.6
c = 10ppm (1×10^{-4} mol·L^{-1}) **γ = 71.9 mN·m^{-1}** **θ = 2.02 %**	504±2	14.0	**c = 1ppm (3.8×10^{-6} mol·L^{-1})** **γ = 71.8 mN·m^{-1}** **θ = 9.74 %**	505±2	5.9
	489±2	13.5		490±1	5.7
	429±1	7.1		430±1	6.6
	415±2	7.5		415±3	6.5
	337±2	6.5		335±1	5.0
	248±2	3.6		251±2	3.0
c = 50ppm (5×10^{-4} mol·L^{-1}) **γ = 71.2 mN·m^{-1}** **θ = 9.08 %**	506±1	4.4	**c = 2ppm (7.6×10^{-6} mol·L^{-1})** **γ = 71.1 mN·m^{-1}** **θ = 17.42 %**	505±1	4.9
	488±3	3.0		491±1	4.7
	430±1	2.3		430±2	5.2
	416±3	2.4		414±1	5.1
	337±1	1.3		335±2	3.4
	250±1	0.9		252±2	2.1
c = 100ppm (1×10^{-3} mol·L^{-1}) **γ = 70.0 mN·m^{-1}** **θ = 16.11 %**	505±2	3.6	**c = 5ppm (1.9×10^{-5} mol·L^{-1})** **γ = 69.8 mN·m^{-1}** **θ = 33.15 %**	506±1	4.0
	490±2	2.2		489±2	3.1
	431±1	0.5		431±1	3.6
	413±2	0.6		414±1	2.8
	334±1	0.6		334±2	1.8
	248±2	0.5		251±1	1.2