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APPENDICES

Appendix A Exprimental Data of Microemulsion Formulation

1. Interfacial tension (IFT)

The interfacial tension of each phase of microemulsion is calculated by following formulation:

$$IFT = e(Vd)^3 n^2 \Delta\rho \qquad (A.1)$$

where σ = interfacial tension (mN/m)

n = number of revolution (rpm)

$e = 3.427 \times 10^{-4}$ (mN cm^3 min^2/m g mm^3)

V = 0.31 (mm/sdv)

D = measured drop diameter (sdv)

$\Delta\rho$ = density difference of two liquids (g/cm^3)

2. Experiment data of interfacial tension

Table A-1 Equilibrium interfacial tension as a function of Surfactant ratio: oil loading ratio with formulation of 0.1 wt.% Alfoterra 145-3PO, 5 wt.% Tergitol 15-S-5, and 5 wt.% NaCl.

Surfactant ratio : oil loading ratio	Wsurf (g.)	Vsurf (ml.)	Density,surf (g. /ml.)	Woil (g.)	Voil (ml.)	Density,oil (g. /ml.)	Density (g./ml.)	D (sdv)	round (rpm.)	IFT (mN. /m.)
1:01	2.2066	0.002	1.1033	0.0522	0.00006	0.8700	0.2333	0.4	2499	0.000952
1:03	2.2579	0.002	1.1290	0.0178	0.00002	0.8900	0.2390	1.2	1063	0.004763
1:05	2.2046	0.002	1.1023	0.0356	0.00004	0.8900	0.2123	1.4	1584	0.014923
1:07	2.2046	0.002	1.1023	0.0356	0.00004	0.8900	0.2123	1.4	1648	0.016039
1:09	2.2021	0.002	1.1011	0.0379	0.00004	0.9475	0.1535	1	3484	0.019029
1:10	2.1488	0.002	1.1309	0.0370	0.00004	0.9250	0.2059	1.8	2007	0.049393

Table A-2 Dynamic interfacial tension as a function of % active surfactant concentration with formulation of 0.1 wt.% Alfoterra 145-3PO, 5 wt.% Tergitol 15-S-5, and 5 wt.% NaCl.

% active	W_{surf} (g)	V_{surf} (ml)	Density,surf (g/ml)	W_{oil} (g)	V_{oil} (ml)	Density,oil (g/ml)	Δp (g/ml)	D (sdv)	round (rpm)	IFT (mN/m)
0.001	2.2468	0.002	1.1234	0.0083	0.00001	0.83	0.2934	2.8	2005	0.2643
0.003	2.2716	0.002	1.1358	0.0091	0.00001	0.91	0.2258	2.9	2006	0.2262
0.005	2.2832	0.002	1.1416	0.0091	0.00001	0.91	0.2316	2.6	2005	0.1671
0.006	2.2847	0.002	1.1424	0.0091	0.00001	0.91	0.2323	2.6	2008	0.1681
0.007	2.2698	0.002	1.1349	0.0091	0.00001	0.91	0.2249	2.6	2003	0.1619
0.009	2.2722	0.002	1.1361	0.0091	0.00001	0.91	0.2261	2.4	2002	0.1279
0.01	2.2810	0.002	1.1405	0.0091	0.00001	0.91	0.2305	2.5	2004	0.1477
0.015	2.2415	0.002	1.1208	0.0091	0.00001	0.91	0.2107	2.0	2006	0.0693
0.02	2.2446	0.002	1.1223	0.0091	0.00001	0.91	0.2123	2.1	2006	0.0808
0.025	2.2310	0.002	1.1155	0.0091	0.00001	0.91	0.2055	2.0	2006	0.0675
0.03	2.2522	0.002	1.1261	0.0091	0.00001	0.91	0.2161	2.0	2006	0.0710
0.035	2.2441	0.002	1.1221	0.0091	0.00001	0.91	0.2120	2.0	2006	0.0697
0.04	2.2364	0.002	1.1182	0.0091	0.00001	0.91	0.2082	1.5	2009	0.0290
0.045	2.2707	0.002	1.1354	0.0091	0.00001	0.91	0.2253	1.6	2003	0.0378
0.05	2.2177	0.002	1.1089	0.0091	0.00001	0.91	0.1988	1.6	2007	0.0335
0.07	2.2107	0.002	1.1054	0.0091	0.00001	0.91	0.1953	1.7	2009	0.0395
0.09	2.2335	0.002	1.1168	0.0091	0.00001	0.91	0.2067	1.7	2003	0.0416
0.1	2.1792	0.002	1.0896	0.0091	0.00001	0.91	0.1796	1.7	2007	0.0363
0.3	2.2895	0.002	1.1448	0.0091	0.00001	0.91	0.2347	1.7	2013	0.0477
0.5	2.2898	0.002	1.1449	0.0091	0.00001	0.91	0.2349	1.7	2010	0.0476

Appendix B Experimental data of detergency experiment

1. %Detergency (%D)

The detergency performance can be is calculated by following formulation:

$$\%\text{Detergency} = [(A-B)/(C-B)] \times 100 \qquad (B.1)$$

where A = average reflectance of the soiled swatches after washing

B = average reflectance of the soiled swatches before washing

C_0 = average reflectance of the unsoiled swatches before washing

2. % oil removal

The oil removal is calculated from the calibration curve for colored motor oil.

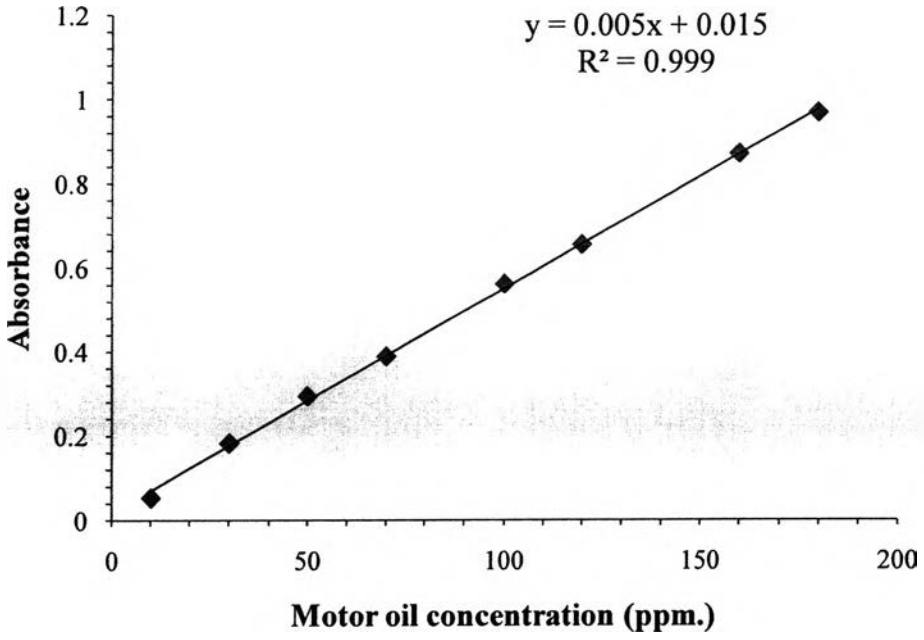

Figure B.1 Relationship between colored motor oil concentration and the absorbance measured at 520 nm.

3. Adsorption isotherm

The Adsorption isotherm can be determined by %Detergency; it is calculated from the following equation:

$$\Gamma = \frac{(C_0 - C)V}{W_{fabric} a_s}, \qquad \text{(B.2)}$$

where V = the volume of a surfactant solution (l)

W_{fabric} = the weight of fabric sample (g)

a_s = the specific surface area of fabric (m^2/g)

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