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## APPENDICES

### Appendix A Surface Tension of Surfactant Solutions

**Table A1** Surface tension of SDS surfactant solutions at pH5, pH7 and pH9

| Initial surfactant concentration( $\mu\text{M}$ ) | Surface tension (mN/m) |       |       |
|---|------------------------|-------|-------|
|   | pH5                    | pH7   | pH9   |
| 200   | 71.29                  | 70.88 | 71.48 |
| 400   | 70.60                  | 69.98 | 70.29 |
| 600   | 69.46                  | 69.33 | 67.87 |
| 800   | 68.30                  | 68.29 | 67.06 |
| 1,000   | 67.64                  | 66.64 | 65.52 |
| 2,000   | 60.55                  | 61.38 | 58.79 |
| 4,000   | 51.14                  | 51.77 | 50.94 |
| 5,000   | 46.90                  | 47.20 | 46.53 |
| 6,000   | 43.64                  | 42.49 | 43.43 |
| 7,000   | 41.23                  | 40.45 | 40.95 |
| 8,000   | 38.41                  | 38.82 | 38.46 |
| 9,000   | 38.50                  | 38.75 | 37.64 |
| 10,000  | 38.46                  | 38.42 | 37.63 |
| 12,000  | 38.29                  | 38.10 | 37.44 |
| 15,000  | 38.15                  | 38.43 | 37.24 |
| 20,000  | 38.34                  | 38.39 | 37.47 |

**Table A2** Surface tension of CTAB surfactant solutions at pH5, pH7 and pH9

| Initial surfactant concentration( $\mu\text{M}$ ) | Surface tension (mN/m) |       |       |
|---|------------------------|-------|-------|
|   | pH5                    | pH7   | pH9   |
| 100   | 61.09                  | 60.97 | 60.45 |
| 200   | 56.75                  | 57.05 | 56.70 |
| 300   | 51.91                  | 52.70 | 51.62 |
| 400   | 47.95                  | 48.53 | 47.33 |
| 500   | 43.67                  | 43.97 | 43.55 |
| 600   | 40.73                  | 40.40 | 39.38 |
| 700   | 37.84                  | 37.99 | 38.12 |
| 800   | 36.52                  | 36.80 | 36.50 |
| 900   | 36.27                  | 36.08 | 35.41 |
| 1,000   | 36.41                  | 35.76 | 34.77 |
| 1,500   | 36.16                  | 35.42 | 34.13 |
| 2,000   | 36.32                  | 35.11 | 33.79 |
| 3,000   | 36.47                  | 35.39 | 34.03 |
| 5,000   | 36.34                  | 34.84 | 33.61 |
| 8,000   | 35.79                  | 34.96 | 34.17 |
| 10,000  | 36.36                  | 34.99 | 33.89 |
| 15,000  | 35.34                  | 35.22 | 33.63 |

**Table A3** Surface tension of AE7 surfactant solutions at pH5, pH7 and pH9

| Initial surfactant concentration( $\mu\text{M}$ ) | Surface tension (mN/m) |       |       |
|---|------------------------|-------|-------|
|   | pH5                    | pH7   | pH9   |
| 6   | 70.85                  | 71.50 | 71.52 |
| 10  | 69.08                  | 69.07 | 70.00 |
| 16  | 67.02                  | 66.46 | 66.57 |
| 20  | 64.50                  | 64.39 | 64.43 |
| 22  | 63.17                  | 62.65 | 62.58 |
| 24  | 61.50                  | 61.18 | 61.71 |
| 26  | 60.81                  | 60.52 | 59.72 |
| 28  | 59.64                  | 59.09 | 58.04 |
| 30  | 57.93                  | 58.62 | 57.85 |
| 32  | 56.39                  | 55.45 | 56.37 |
| 36  | 54.59                  | 54.34 | 54.71 |
| 40  | 52.77                  | 53.79 | 51.27 |
| 50  | 49.30                  | 51.27 | 48.97 |
| 100   | 41.07                  | 40.11 | 38.48 |
| 140   | 35.85                  | 36.05 | 35.46 |
| 180   | 32.72                  | 34.05 | 33.73 |
| 220   | 30.84                  | 31.10 | 30.80 |
| 280   | 30.96                  | 30.57 | 30.59 |
| 300   | 30.41                  | 30.88 | 31.06 |
| 500   | 30.03                  | 29.63 | 29.20 |
| 700   | 28.83                  | 28.86 | 28.73 |

## Appendix B Adsorption Isotherm of Surfactant Solutions

**Table B1** Adsorption isotherm of SDS surfactant solutions on talcum powder at pH5, pH7 and pH9

| Initial surfactant concentration ( $\mu\text{M}$ ) | Equilibrium surfactant concentration ( $\mu\text{M}$ ) |           |           | Amount of adsorbed surfactant ( $\mu\text{mole}/\text{m}^2$ ) |       |       |
|--|--|-----------|-----------|---|-------|-------|
|  | pH5  | pH7       | pH9       | pH5   | pH7   | pH9   |
| 200  | 161.53   | 149.46    | 172.47    | 0.61  | 0.80  | 0.44  |
| 400  | 312.36   | 332.54    | 355.83    | 1.39  | 1.07  | 0.70  |
| 600  | 469.36   | 496.60    | 549.20    | 2.08  | 1.64  | 0.81  |
| 800  | 656.05   | 702.11    | 743.79    | 2.29  | 1.55  | 0.89  |
| 1,000  | 717.83   | 778.99    | 812.62    | 4.48  | 3.52  | 2.97  |
| 2,000  | 1,214.65   | 1,588.73  | 1,698.53  | 12.51   | 6.55  | 4.80  |
| 4,000  | 2,806.37   | 3,275.46  | 3,439.77  | 19.01   | 11.52 | 8.86  |
| 5,000  | 3,738.85   | 4,144.14  | 4,337.16  | 20.03   | 13.65 | 10.48 |
| 6,000  | 4,642.68   | 5,131.33  | 5,258.13  | 21.63   | 13.83 | 11.75 |
| 7,000  | 5,649.68   | 6,147.98  | 6,289.99  | 21.38   | 13.47 | 11.35 |
| 8,000  | 6,573.25   | 7,270.98  | 7,272.15  | 22.73   | 11.56 | 11.51 |
| 9,000  | 7,566.88   | 8,283.15  | 8,317.40  | 22.75   | 11.34 | 10.90 |
| 10,000   | 8,624.20   | 9,192.83  | 9,292.54  | 21.85   | 12.83 | 11.24 |
| 12,000   | 10,554.14  | 11,223.57 | 11,338.43 | 22.92   | 12.40 | 10.56 |
| 15,000   | 13,617.83  | 14,368.99 | 14,404.08 | 21.99   | 10.00 | 9.43  |
| 20,000   | 18,643.31  | 19,269.70 | 19,254.30 | 21.45   | 11.61 | 11.87 |

**Table B2** Adsorption isotherm of CTAB surfactant solutions on talcum powder at pH5, pH7 and pH9

| Initial surfactant concentration ( $\mu\text{M}$ ) | Equilibrium surfactant concentration( $\mu\text{M}$ ) |           |           | Amount of adsorbed surfactant ( $\mu\text{mole}/\text{m}^2$ ) |       |       |
|--|---|-----------|-----------|---|-------|-------|
|  | pH5   | pH7       | pH9       | pH5   | pH7   | pH9   |
| 100  | 37.51   | 43.05     | 39.69     | 0.99  | 0.90  | 0.95  |
| 200  | 74.43   | 86.30     | 82.34     | 1.98  | 1.80  | 1.86  |
| 300  | 89.85   | 150.59    | 142.49    | 3.33  | 2.37  | 2.50  |
| 400  | 125.09  | 228.33    | 210.82    | 4.35  | 2.72  | 3.00  |
| 500  | 167.96  | 263.28    | 271.20    | 5.24  | 3.76  | 3.63  |
| 600  | 197.20  | 284.56    | 319.94    | 6.37  | 5.01  | 4.43  |
| 700  | 272.23  | 350.79    | 393.78    | 6.77  | 5.54  | 4.86  |
| 800  | 298.80  | 403.65    | 305.78    | 7.91  | 6.26  | 7.82  |
| 900  | 377.31  | 410.38    | 457.12    | 8.25  | 7.73  | 7.03  |
| 1,000  | 423.09  | 615.85    | 526.36    | 9.11  | 6.09  | 7.50  |
| 1,500  | 934.08  | 1,058.37  | 1,034.62  | 8.97  | 6.99  | 7.36  |
| 2,000  | 1,356.77  | 1,408.19  | 1,383.56  | 10.19   | 9.35  | 9.76  |
| 3,000  | 2,264.88  | 2,304.01  | 2,323.76  | 11.64   | 11.04 | 10.69 |
| 5,000  | 4,198.96  | 4,256.18  | 4,323.37  | 12.67   | 11.78 | 10.73 |
| 8,000  | 7,227.33  | 7,288.20  | 7,317.07  | 12.22   | 11.25 | 10.82 |
| 10,000   | 9,141.03  | 9,270.37  | 9,354.84  | 13.58   | 11.56 | 10.22 |
| 15,000   | 14,234.92   | 14,187.27 | 14,354.84 | 12.09   | 12.87 | 10.24 |



**Table B3** Adsorption isotherm of AE7 surfactant solutions on talcum powder at pH5, pH7 and pH9

| Initial surfactant concentration ( $\mu\text{M}$ ) | Equilibrium surfactant concentration ( $\mu\text{M}$ ) |        |        | Amount of adsorbed surfactant ( $\mu\text{mole}/\text{m}^2$ ) |      |      |
|--|--|--------|--------|---|------|------|
|  | pH5  | pH7    | pH9    | pH5   | pH7  | pH9  |
| 26   | 15.89  | 16.49  | 15.70  | 0.16  | 0.15 | 0.16 |
| 30   | 16.87  | 18.16  | 15.74  | 0.21  | 0.19 | 0.23 |
| 32   | 17.15  | 19.80  | 17.03  | 0.24  | 0.19 | 0.24 |
| 36   | 16.09  | 19.41  | 17.63  | 0.32  | 0.26 | 0.29 |
| 40   | 17.39  | 18.90  | 18.21  | 0.36  | 0.34 | 0.35 |
| 50   | 18.90  | 20.76  | 19.00  | 0.49  | 0.46 | 0.49 |
| 80   | 25.89  | 19.93  | 19.44  | 0.86  | 0.95 | 0.96 |
| 100  | 35.80  | 24.87  | 21.99  | 1.02  | 1.19 | 1.24 |
| 140  | 44.52  | 38.59  | 33.24  | 1.51  | 1.62 | 1.69 |
| 180  | 59.67  | 52.97  | 47.68  | 1.91  | 2.01 | 2.10 |
| 220  | 72.13  | 67.56  | 62.84  | 2.34  | 2.42 | 2.49 |
| 260  | 83.41  | 82.93  | 77.54  | 2.79  | 2.80 | 2.91 |
| 280  | 87.75  | 100.53 | 96.59  | 3.05  | 2.85 | 2.91 |
| 300  | 121.96   | 123.09 | 119.77 | 2.83  | 2.81 | 2.87 |
| 500  | 311.75   | 319.74 | 315.16 | 3.00  | 2.86 | 2.93 |
| 700  | 505.78   | 517.10 | 511.28 | 3.09  | 2.91 | 2.99 |

### Appendix C Zeta Potential Measurements

**Table C1** Zeta potential of talcum powder in water with various pH

| Zeta Potential (mV) | pH    |       |       |        |        |        |        |        |        |
|---------------------|-------|-------|-------|--------|--------|--------|--------|--------|--------|
|                     | 2.14  | 2.98  | 3.02  | 4.13   | 5.13   | 6.13   | 7.26   | 8.06   | 9.18   |
| 1                   | 45.26 | 29.09 | 26.44 | -39.00 | -48.20 | -50.80 | -59.20 | -69.80 | -68.30 |
| 2                   | 47.42 | 21.21 | 27.71 | -41.00 | -30.30 | -53.00 | -53.60 | -71.20 | -63.50 |
| 3                   | 46.64 | 30.04 | 26.60 | -40.80 | -43.90 | -44.20 | -59.60 | -71.20 | -79.30 |
| 4                   | 51.17 | 25.75 | 29.53 | -44.30 | -38.90 | -45.60 | -58.60 | -69.80 | -61.60 |
| 5                   | 48.42 | 33.28 | 27.89 | -44.00 | -49.20 | -41.60 | -61.90 | -79.10 | -64.30 |
| 6                   | 51.89 | 31.36 | 22.60 | -35.90 | -34.6  | -48.80 | -59.80 | -63.30 | -70.60 |
| 7                   | 58.81 | 30.53 | 25.60 | -43.40 | -46.10 | -56.80 | -57.50 | -60.10 | -72.90 |
| 8                   | 54.58 | 24.26 | 25.11 | -37.30 | -44.60 | -49.10 | -58.10 | -62.80 | -70.60 |
| 9                   | 43.49 | 28.05 | 21.40 | -35.40 | -40.60 | -45.30 | -56.80 | -72.50 | -61.60 |
| 10                  | 48.80 | 29.10 | 23.73 | -37.70 | -54.20 | -44.00 | -59.80 | -70.80 | -62.70 |
| 11                  | 52.33 | 31.98 | 21.16 | -40.60 | -36.60 | -52.60 | -60.20 | -77.30 | -72.50 |
| 12                  | 45.49 | 32.28 | 26.91 | -45.60 | -49.20 | -48.80 | -59.60 | -63.10 | -64.20 |
| 13                  | 44.60 | 24.72 | 23.45 | -45.20 | -42.50 | -50.60 | -61.30 | -67.90 | -62.20 |
| 14                  | 51.89 | 23.63 | 25.96 | -42.40 | -50.60 | -50.30 | -58.30 | -63.40 | -75.90 |
| 15                  | 53.02 | 30.04 | 21.51 | -39.00 | -44.60 | -52.00 | -61.90 | -60.70 | -68.40 |
| 16                  | 45.67 | 27.05 | 24.97 | -42.80 | -44.20 | -48.00 | -60.20 | -64.40 | -73.60 |
| 17                  | 49.60 | 29.98 | 29.07 | -37.50 | -47.50 | -45.70 | -59.20 | -61.50 | -72.30 |
| 18                  | 54.71 | 29.58 | 24.54 | -36.10 | -46.40 | -45.60 | -59.60 | -60.00 | -71.90 |
| 19                  | 45.90 | 31.84 | 27.47 | -40.90 | -46.40 | -47.60 | -57.70 | -64.00 | -68.30 |
| 20                  | 50.52 | 28.46 | 27.15 | -37.30 | -46.90 | -49.50 | -57.00 | -71.20 | -65.40 |
| 21                  | 44.24 | 28.17 | 27.47 | -44.30 | -49.00 | -49.00 | -59.40 | -66.00 | -63.20 |
| 22                  | 47.20 | 30.94 | 20.85 | -33.00 | -44.00 | -50.00 | -60.90 | -70.30 | -71.30 |
| 23                  | 51.42 | 32.65 | 26.44 | -39.30 | -43.30 | -49.10 | -61.90 | -70.00 | -60.10 |
| 24                  | 51.31 | 28.53 | 25.39 | -42.80 | -53.00 | -53.70 | -56.80 | -63.30 | -67.20 |
| 25                  | 47.20 | 31.44 | 22.42 | -42.10 | -49.30 | -52.00 | -58.80 | -68.60 | -69.20 |
| Average             | 49.26 | 28.96 | 25.25 | -40.31 | -44.96 | -48.95 | -59.11 | -67.29 | -68.04 |

**Table C2** Zeta potential of talcum powder in SDS surfactant at 0.2CMC concentration

| Zeta Potential (mV) | pH5    | pH7    | pH9    |
|---------------------|--------|--------|--------|
| 1                   | -69.30 | -84.40 | -86.00 |
| 2                   | -61.30 | -75.90 | -87.00 |
| 3                   | -49.90 | -73.20 | -80.00 |
| 4                   | -47.20 | -81.70 | -83.00 |
| 5                   | -61.30 | -68.30 | -87.00 |
| 6                   | -53.40 | -76.10 | -98.70 |
| 7                   | -51.20 | -75.90 | -84.00 |
| 8                   | -59.00 | -81.20 | -97.60 |
| 9                   | -58.00 | -68.80 | -82.00 |
| 10                  | -62.80 | -67.60 | -80.00 |
| 11                  | -57.00 | -74.70 | -88.00 |
| 12                  | -60.90 | -70.20 | -83.00 |
| 13                  | -46.10 | -71.90 | -97.40 |
| 14                  | -64.30 | -67.10 | -98.50 |
| 15                  | -51.10 | -64.10 | -93.50 |
| 16                  | -51.40 | -79.50 | -97.90 |
| 17                  | -48.90 | -76.80 | -94.90 |
| 18                  | -64.40 | -79.00 | -860   |
| 19                  | -56.40 | -64.80 | -95.60 |
| 20                  | -52.20 | -73.80 | -91.20 |
| Average             | -56.31 | -73.75 | -89.56 |

**Table C3** Zeta potential of talcum powder in SDS surfactant at CMC concentration

| Zeta Potential (mV) | pH5    | pH7    | pH9     |
|---------------------|--------|--------|---------|
| 1                   | -85.1  | -98.00 | -93.20  |
| 2                   | -81.40 | -84.80 | -96.20  |
| 3                   | -86.40 | -90.80 | -87.50  |
| 4                   | -79.50 | -89.50 | -91.10  |
| 5                   | -84.40 | -85.10 | -93.20  |
| 6                   | -81.40 | -89.80 | -91.00  |
| 7                   | -96.50 | -90.80 | -91.70  |
| 8                   | -81.60 | -94.20 | -94.60  |
| 9                   | -86.80 | -99.10 | -93.50  |
| 10                  | -85.80 | -95.50 | -94.90  |
| 11                  | -80.00 | -85.30 | -101.00 |
| 12                  | -78.80 | -89.80 | -95.30  |
| 13                  | -83.90 | -95.50 | -89.70  |
| 14                  | -82.60 | -90.30 | -81.50  |
| 15                  | -82.40 | -80.90 | -93.00  |
| 16                  | -82.90 | -89.20 | -99.60  |
| 17                  | -88.60 | -92.20 | -101.00 |
| 18                  | -79.50 | -89.80 | -89.70  |
| 19                  | -83.10 | -80.90 | -85.80  |
| 20                  | -79.30 | -90.80 | -96.60  |
| Average             | -83.50 | -90.11 | -93.00  |

**Table C4** Zeta potential of talcum powder in SDS surfactant at 2CMC concentration

| Zeta Potential (mV) | pH5    | pH7    | pH9    |
|---------------------|--------|--------|--------|
| 1                   | -85.10 | -88.30 | -90.00 |
| 2                   | -92.30 | -94.20 | -89.50 |
| 3                   | -86.10 | -88.30 | -88.00 |
| 4                   | -86.70 | -94.50 | -87.50 |
| 5                   | -93.20 | -87.70 | -88.60 |
| 6                   | -86.10 | -88.30 | -94.50 |
| 7                   | -86.70 | -86.70 | -89.20 |
| 8                   | -93.20 | -95.50 | -96.20 |
| 9                   | -86.70 | -90.00 | -93.20 |
| 10                  | -86.70 | -89.20 | -88.60 |
| 11                  | -94.50 | -90.10 | -94.20 |
| 12                  | -85.60 | -86.90 | -90.30 |
| 13                  | -88.30 | -92.60 | -91.10 |
| 14                  | -99.40 | -92.00 | -91.40 |
| 15                  | -87.50 | -92.00 | -90.80 |
| 16                  | -92.50 | -89.80 | -86.70 |
| 17                  | -82.60 | -95.50 | -90.00 |
| 18                  | -94.50 | -86.10 | -88.00 |
| 19                  | -93.90 | -87.50 | -90.00 |
| 20                  | -94.80 | -88.90 | -86.90 |
| Average             | -89.82 | -90.20 | -90.23 |

**Table C5** Zeta potential of talcum powder in CTAB surfactant at 0.2CMC concentration

| Zeta Potential (mV) | pH5   | pH7   | pH9   |
|---------------------|-------|-------|-------|
| 1                   | 57.17 | 56.51 | 62.00 |
| 2                   | 57.00 | 52.00 | 67.90 |
| 3                   | 56.75 | 66.24 | 60.59 |
| 4                   | 57.00 | 65.65 | 65.55 |
| 5                   | 50.53 | 50.39 | 64.23 |
| 6                   | 59.25 | 51.41 | 64.46 |
| 7                   | 59.64 | 61.89 | 59.25 |
| 8                   | 55.42 | 62.91 | 62.52 |
| 9                   | 53.38 | 58.20 | 58.97 |
| 10                  | 51.03 | 59.18 | 62.10 |
| 11                  | 56.82 | 61.29 | 64.92 |
| 12                  | 59.16 | 56.02 | 59.74 |
| 13                  | 55.42 | 58.90 | 58.34 |
| 14                  | 53.38 | 57.47 | 60.97 |
| 15                  | 54.01 | 63.78 | 57.46 |
| 16                  | 51.41 | 58.90 | 62.10 |
| 17                  | 56.75 | 61.08 | 55.60 |
| 18                  | 49.96 | 50.32 | 56.65 |
| 19                  | 50.03 | 61.62 | 63.68 |
| 20                  | 52.43 | 59.40 | 56.40 |
| Average             | 54.82 | 58.65 | 61.17 |

**Table C6** Zeta potential of talcum powder in CTAB surfactant at CMC concentration

| Zeta Potential (mV) | pH5   | pH7   | pH9   |
|---------------------|-------|-------|-------|
| 1                   | 63.23 | 55.77 | 53.94 |
| 2                   | 55.67 | 50.18 | 62.42 |
| 3                   | 56.68 | 63.33 | 67.45 |
| 4                   | 60.38 | 61.39 | 58.41 |
| 5                   | 51.09 | 65.05 | 67.20 |
| 6                   | 62.91 | 64.00 | 58.80 |
| 7                   | 61.60 | 58.41 | 68.64 |
| 8                   | 64.92 | 61.08 | 72.22 |
| 9                   | 50.46 | 57.28 | 63.78 |
| 10                  | 54.08 | 63.78 | 71.38 |
| 11                  | 53.77 | 68.39 | 72.22 |
| 12                  | 58.52 | 62.31 | 70.82 |
| 13                  | 60.13 | 53.83 | 64.92 |
| 14                  | 50.46 | 62.00 | 67.37 |
| 15                  | 58.90 | 58.69 | 59.58 |
| 16                  | 56.51 | 59.96 | 60.59 |
| 17                  | 54.85 | 60.87 | 62.81 |
| 18                  | 54.85 | 63.23 | 65.19 |
| 19                  | 61.69 | 62.42 | 67.90 |
| 20                  | 53.24 | 59.07 | 67.62 |
| Average             | 57.20 | 60.55 | 65.16 |

**Table C7** Zeta potential of talcum powder in CTAB surfactant at 2CMC concentration

| Zeta Potential (mV) | pH5   | pH7   | pH9   |
|---------------------|-------|-------|-------|
| 1                   | 73.35 | 75.85 | 78.45 |
| 2                   | 81.19 | 92.62 | 83.58 |
| 3                   | 75.53 | 85.45 | 89.91 |
| 4                   | 78.87 | 84.64 | 83.97 |
| 5                   | 80.84 | 76.02 | 89.49 |
| 6                   | 70.96 | 74.93 | 90.79 |
| 7                   | 68.53 | 79.36 | 81.54 |
| 8                   | 77.67 | 84.35 | 84.54 |
| 9                   | 76.86 | 71.67 | 84.18 |
| 10                  | 75.85 | 89.24 | 86.04 |
| 11                  | 69.41 | 81.54 | 81.37 |
| 12                  | 71.61 | 86.04 | 86.67 |
| 13                  | 82.67 | 81.37 | 81.19 |
| 14                  | 69.03 | 73.88 | 84.83 |
| 15                  | 76.31 | 89.49 | 84.85 |
| 16                  | 72.51 | 77.67 | 84.64 |
| 17                  | 74.16 | 74.62 | 85.03 |
| 18                  | 82.1  | 79.01 | 83.40 |
| 19                  | 82.82 | 78.70 | 86.65 |
| 20                  | 79.71 | 81.54 | 83.40 |
| Average             | 75.99 | 80.89 | 84.72 |



**Table C8** Zeta potential of talcum powder in AE7 surfactant at 0.2CMC concentration

| Zeta Potential (mV) | pH5    | pH7    | pH9    |
|---------------------|--------|--------|--------|
| 1                   | -38.00 | -47.20 | -40.60 |
| 2                   | -41.60 | -46.50 | -46.10 |
| 3                   | -46.00 | -47.50 | -44.00 |
| 4                   | -39.80 | -47.50 | -42.10 |
| 5                   | -44.10 | -45.70 | -41.80 |
| 6                   | -40.70 | -43.50 | -40.00 |
| 7                   | -44.40 | -38.90 | -43.40 |
| 8                   | -38.70 | -42.70 | -51.30 |
| 9                   | -44.40 | -36.30 | -41.60 |
| 10                  | -38.80 | -32.70 | -38.10 |
| 11                  | -38.40 | -42.70 | -39.40 |
| 12                  | -39.70 | -36.80 | -43.70 |
| 13                  | -42.00 | -34.40 | -37.20 |
| 14                  | -40.40 | -43.50 | -38.90 |
| 15                  | -45.50 | -42.80 | -41.70 |
| 16                  | -48.00 | -44.40 | -43.40 |
| 17                  | -35.02 | -39.80 | -42.50 |
| 18                  | -47.00 | -43.50 | -44.00 |
| 19                  | -42.80 | -42.00 | -45.60 |
| 20                  | -44.40 | -41.50 | -47.00 |
| Average             | -41.98 | -41.99 | -42.62 |

**Table C9** Zeta potential of talcum powder in AE7 surfactant at CMC concentration

| Zeta Potential (mV) | pH5    | pH7    | pH9    |
|---------------------|--------|--------|--------|
| 1                   | -59.80 | -49.00 | -59.20 |
| 2                   | -61.70 | -56.20 | -52.50 |
| 3                   | -44.50 | -43.50 | -51.00 |
| 4                   | -43.90 | -40.10 | -51.40 |
| 5                   | -47.80 | -42.30 | -50.30 |
| 6                   | -39.00 | -48.40 | -54.40 |
| 7                   | -38.50 | -51.60 | -51.30 |
| 8                   | -40.10 | -47.00 | -48.50 |
| 9                   | -39.00 | -52.90 | -57.00 |
| 10                  | -38.00 | -50.30 | -49.20 |
| 11                  | -40.00 | -53.70 | -48.80 |
| 12                  | -35.50 | -50.60 | -54.70 |
| 13                  | -42.70 | -47.00 | -54.90 |
| 14                  | -41.10 | -53.80 | -54.00 |
| 15                  | -41.50 | -51.80 | -55.00 |
| 16                  | -45.50 | -51.60 | -59.00 |
| 17                  | -42.30 | -47.70 | -52.00 |
| 18                  | -43.00 | -54.70 | -56.00 |
| 19                  | -39.80 | -52.90 | -53.80 |
| 20                  | -40.00 | -55.30 | -55.90 |
| Average             | -43.19 | -50.02 | -53.45 |

**Table C10** Zeta potential of talcum powder in AE7 surfactant at 2CMC concentration

| Zeta Potential (mV) | pH5    | pH7    | pH9    |
|---------------------|--------|--------|--------|
| 1                   | -49.10 | -53.00 | -62.70 |
| 2                   | -44.10 | -61.00 | -66.20 |
| 3                   | -44.40 | -59.10 | -61.80 |
| 4                   | -51.60 | -52.30 | -65.00 |
| 5                   | -49.20 | -52.10 | -60.00 |
| 6                   | -46.90 | -53.40 | -61.80 |
| 7                   | -47.00 | -52.50 | -65.60 |
| 8                   | -50.10 | -57.20 | -57.60 |
| 9                   | -50.50 | -55.80 | -61.10 |
| 10                  | -58.00 | -56.90 | -64.50 |
| 11                  | -52.30 | -56.00 | -61.10 |
| 12                  | -49.90 | -55.80 | -67.10 |
| 13                  | -45.80 | -56.80 | -57.10 |
| 14                  | -51.40 | -51.40 | -64.20 |
| 15                  | -51.00 | -54.10 | -59.40 |
| 16                  | -57.90 | -48.60 | -69.30 |
| 17                  | -49.30 | -56.80 | -65.10 |
| 18                  | -44.40 | -49.30 | -57.30 |
| 19                  | -51.60 | -49.90 | -65.10 |
| 20                  | -52.30 | -49.30 | -60.00 |
| Average             | -49.84 | -54.07 | -62.60 |

## Appendix D Dispersion Stability Measurements

**Table D1** Absorbance of talcum powder in water at 12,000 sec

| pH | Absorbance |
|----|------------|
| 5  | 0.1147     |
| 7  | 0.1731     |
| 9  | 0.2192     |

**Table D2** Absorbance of talcum powder in SDS surfactant at 12,000 sec

| pH | Absorbance |        |        |
|----|------------|--------|--------|
|    | 0.2CMC     | CMC    | 2CMC   |
| 5  | 0.2573     | 0.3299 | 0.3680 |
| 7  | 0.2957     | 0.3327 | 0.3537 |
| 9  | 0.3127     | 0.3299 | 0.3410 |

**Table D3** Absorbance of talcum powder in CTAB surfactant at 12,000 sec

| pH | Absorbance |        |        |
|----|------------|--------|--------|
|    | 0.2CMC     | CMC    | 2CMC   |
| 5  | 0.2301     | 0.2934 | 0.3360 |
| 7  | 0.2325     | 0.2944 | 0.3429 |
| 9  | 0.2418     | 0.2737 | 0.3316 |

**Table D4** Absorbance of talcum powder in AE7 surfactant at 12,000 sec

| pH | Absorbance |        |        |
|----|------------|--------|--------|
|    | 0.2CMC     | CMC    | 2CMC   |
| 5  | 0.1738     | 0.2848 | 0.3176 |
| 7  | 0.1934     | 0.2780 | 0.3051 |
| 9  | 0.2270     | 0.2451 | 0.3149 |

## Appendix E Contact Angle Measurements

**Table E1** Contact angle of SDS surfactant

| Surfactant Concentration ( $\mu\text{mol/l}$ ) | Contact Angle (degree) |       |       |
|--|------------------------|-------|-------|
|  | pH5                    | pH7   | pH9   |
| 0  | 62.85                  | 67.05 | 68.30 |
| 200  | 59.90                  | 61.70 | 60.75 |
| 800  | 58.25                  | 59.70 | 55.60 |
| 2,000  | 55.90                  | 56.20 | 53.90 |
| 5,000  | 41.35                  | 48.00 | 44.40 |
| 7,000  | 34.00                  | 38.85 | 37.25 |
| 8,000  | 32.10                  | 31.85 | 33.80 |
| 9,000  | 29.40                  | 31.45 | 31.80 |
| 10,000   | 27.60                  | 28.50 | 31.90 |
| 12,000   | 25.90                  | 27.80 | 30.95 |
| 15,000   | 26.10                  | 28.10 | 31.60 |
| 20,000   | 26.60                  | 28.10 | 31.50 |

**Table E2** Contact angle of CTAB surfactant

| Surfactant Concentration ( $\mu\text{mol/l}$ ) | Contact Angle (degree) |       |       |
|--|------------------------|-------|-------|
|  | pH5                    | pH7   | pH9   |
| 0  | 62.85                  | 67.05 | 68.30 |
| 100  | 59.40                  | 60.60 | 62.50 |
| 400  | 56.30                  | 58.05 | 58.70 |
| 600  | 53.75                  | 53.40 | 52.70 |
| 800  | 44.40                  | 42.75 | 42.90 |
| 1,000  | 38.30                  | 36.65 | 38.90 |
| 2,000  | 33.05                  | 33.25 | 31.95 |
| 3,000  | 30.40                  | 30.35 | 31.45 |
| 5,000  | 29.25                  | 27.85 | 30.65 |
| 8,000  | 28.00                  | 28.05 | 28.50 |
| 10,000   | 25.65                  | 26.55 | 29.10 |

**Table E3** Contact angle of AE7 surfactant

| Surfactant Concentration ( $\mu\text{mol/l}$ ) | Contact Angle (degree) |       |       |
|--|------------------------|-------|-------|
|  | pH5                    | pH7   | pH9   |
| 0  | 62.85                  | 67.05 | 68.30 |
| 22   | 57.45                  | 58.20 | 59.90 |
| 26   | 55.80                  | 55.80 | 58.60 |
| 30   | 52.45                  | 54.95 | 56.85 |
| 36   | 51.60                  | 53.10 | 53.00 |
| 50   | 49.35                  | 51.05 | 48.55 |
| 100  | 40.50                  | 42.15 | 43.95 |
| 180  | 31.30                  | 37.55 | 35.60 |

## CURRICULUM VITAE

**Name:** Ms. Aree Pinpiti

**Date of Birth:** February 2<sup>th</sup>, 1988

**Nationality:** Thai

**University Education:**

2006-2010 Bachelor Degree of Science (Industrial Chemistry) with the first class honor (GPA: 3.54), Faculty of Science, King Mongkut's Institute of Technology Ladkrabang, Bangkok, Thailand.

2003-2006 Saraburiwittayakhom School (Mathematic-Science program) with GPA of 3.55, Saraburi, Thailand.

**Work Experience:**

|      |               |  |
|------|---------------|--|
| 2009 | Position:     | Student Internship                         |
|      | Company name: | PTT Chemical Co., Ltd.<br>Rayong, Thailand |

**Proceeding:**

1. Pinpiti, A., Taechangam, P. and Chavadej, S.(2012, April 24). Adsorption and Dispersion of Talcum Powder in Different Surfactant Solutions. Proceedings of the 3<sup>rd</sup> Research Symposium on Petrochemical and Materials Technology and 18<sup>th</sup> PPC Symposium on Petroleum, Petrochemical, and Polymers, Bangkok, Thailand.

