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## APPENDIX

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## Basic Data of Chapter II

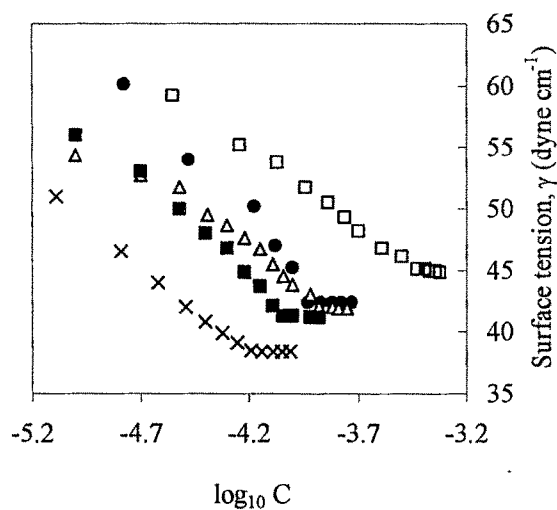


Figure II.I : Surface tension vs log Concentration plots for  $C_{12}E_6$ /MES surfactant mixture at 303 K. •- 1:1,  $C_{12}E_6$ :MES;  $\Delta$ - 3:7,  $C_{12}E_6$ :MES, ■ - 7:3,  $C_{12}E_6$ :MES;  $\square$ -1:9,  $C_{12}E_6$ :MES, x- 9:1,  $C_{12}E_6$ :MES.

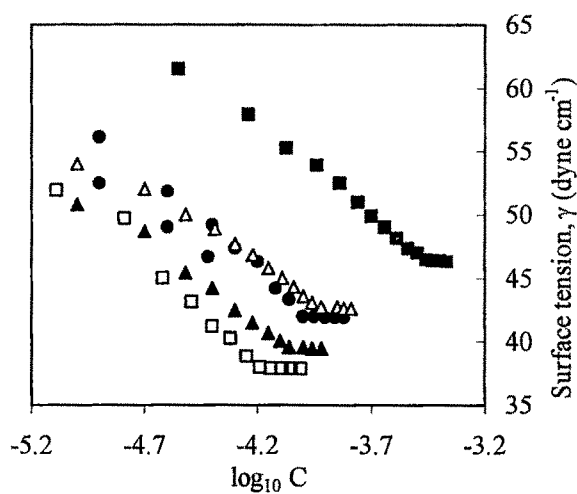


Figure II.II : Surface tension vs log Concentration plots for  $C_{12}E_6$ /MES surfactant mixture at 308 K. •- 1:1,  $C_{12}E_6$ :MES;  $\Delta$ - 3:7,  $C_{12}E_6$ :MES;  $\blacktriangle$  - 7:3,  $C_{12}E_6$ :MES;  $\blacksquare$ -1:9,  $C_{12}E_6$ :MES;  $\square$ - 9:1,  $C_{12}E_6$ :MES.

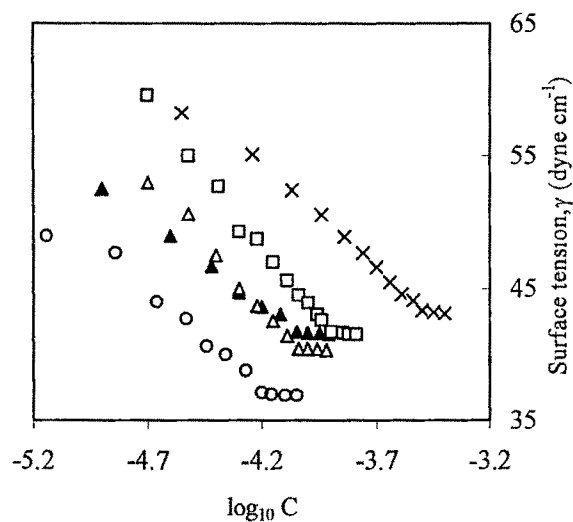


Figure II.III : Surface tension vs log Concentration plots for  $C_{12}E_6$ /MES surfactant mixture at 313 K.  $\blacktriangle$ - 1:1,  $C_{12}E_6$ :MES;  $\square$ - 3:7,  $C_{12}E_6$ :MES;  $\Delta$ - 7:3,  $C_{12}E_6$ :MES;  $\times$  - 1:9,  $C_{12}E_6$  MES;  $o$  - 9:1,  $C_{12}E_6$ :MES.

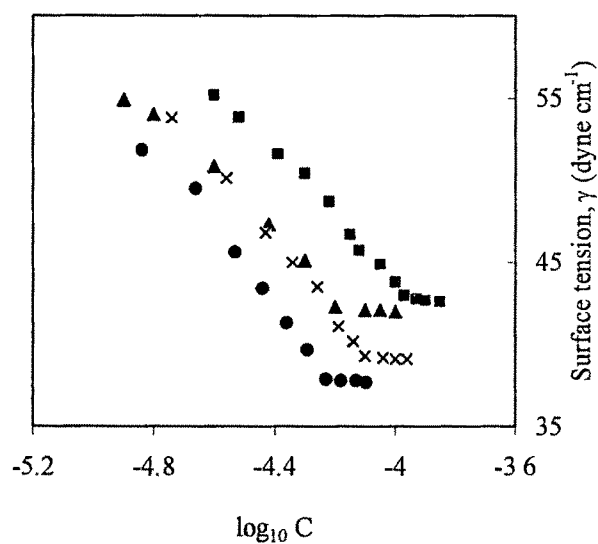


Figure II.IV : Surface tension vs log Concentration plots for  $C_{12}E_6$ /MES surfactant mixture at 318 K.  $\blacktriangle$ - 1:1,  $C_{12}E_6$ :MES;  $\blacksquare$ - 3:7,  $C_{12}E_6$ :MES;  $\times$  - 7:3,  $C_{12}E_6$ :MES;  $\times$  - 1:9,  $C_{12}E_6$ :MES;  $\bullet$  - 9:1,  $C_{12}E_6$ :MES.

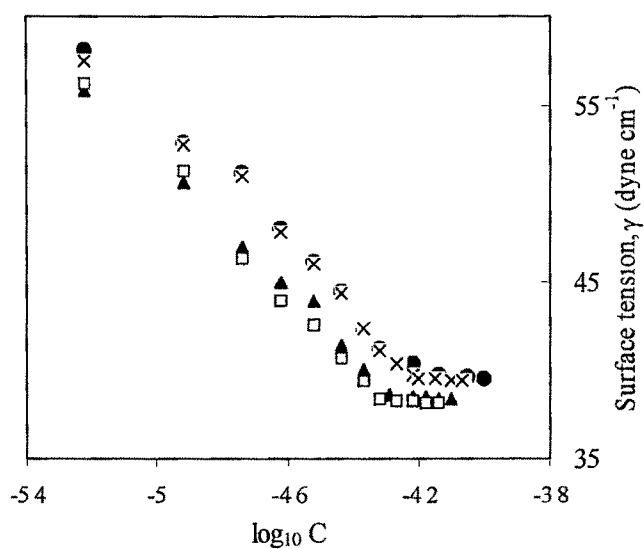


Figure II V : Surface tension vs log Concentration plots for  $C_{12}E_6$  at different temperatures. ●- 303 K, x- 308 K; ▲-313 K; □- 318 K.

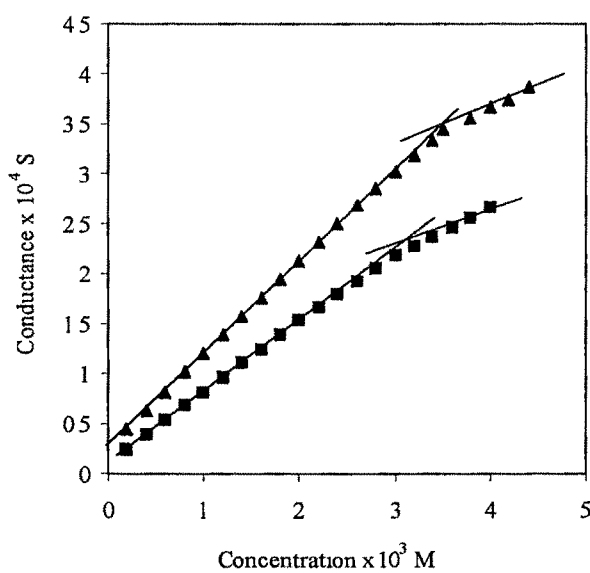


Figure II. VI : Conductance vs concentration of surfactant plots for MES at different temperatures. ■- MES at 303 K; ▲- MES at 318 K

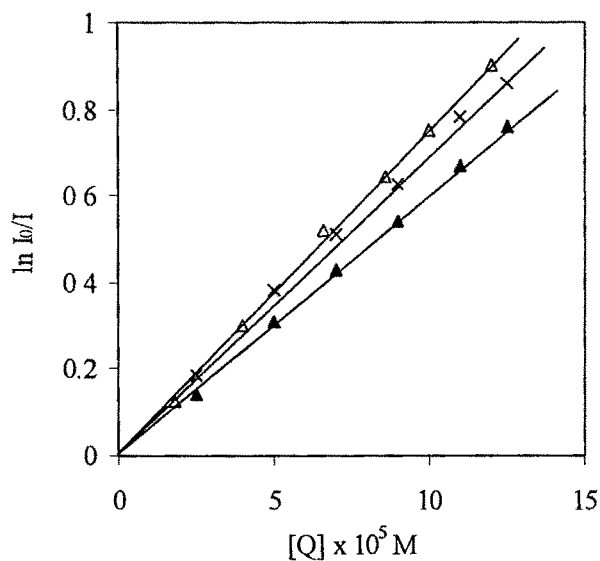


Figure II.VII : Plots of  $\ln I_0/I$  vs Cetyl Pyridinium Chloride Concentration  $[Q]$  for  $C_{12}E_6/MES$  mixed surfactant system.  $\blacktriangle$  - 3:7,  $C_{12}E_6:MES$ ;  $\triangle$  - 7:3,  $C_{12}E_6:MES$ ;  $\times$  - 9:1,  $C_{12}E_6:MES$

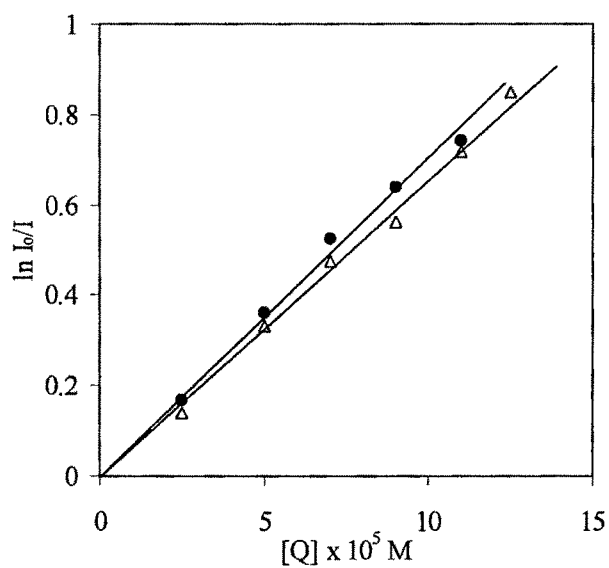


Figure II.VIII : Plots of  $\ln I_0/I$  vs Cetyl Pyridinium Chloride Concentration  $[Q]$  for  $C_{12}E_6/MES$  mixed surfactant system.  $\bullet$  - 1:1,  $C_{12}E_6 : MES$ ;  $\Delta$  -  $MES$ .

Table II I. Average flow times for different surfactant systems (Total Concentration 5%w/v) at different temperatures

System	Average flow time (sec) at different temperatures			
	303	308	313	318 K
Water	86.2	78.3	71.5	65.3
C <sub>12</sub> E <sub>6</sub>	262.7	332.6	420.3	505.9
MES	125.2	113.1	120.7	93.9
9:1 C <sub>12</sub> E <sub>6</sub> :MES	144.5	142.1	145.2	150
7:3 C <sub>12</sub> E <sub>6</sub> :MES	117.7	107.8	97.9	89.7
3:7 C <sub>12</sub> E <sub>6</sub> :MES	122.8	111.7	101.8	91.8
1:9 C <sub>12</sub> E <sub>6</sub> :MES	129.0	110.5	101.1	92.0
1:1 C <sub>12</sub> E <sub>6</sub> :MES	126.0	112.7	103.6	93.7
5 % C <sub>12</sub> E <sub>6</sub> + 0.2M NaCl	382.5	510.4	644.2	-
5 % C <sub>12</sub> E <sub>6</sub> + 0.5M NaCl	637.7	840.8	-	-

## Basic Data of Chapter III

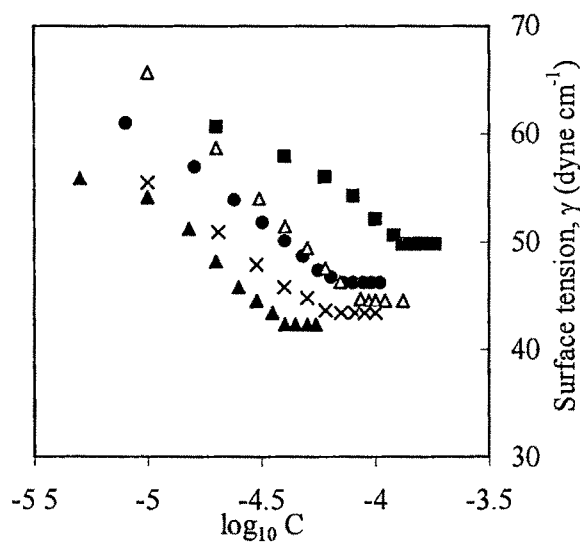


Figure III I : Surface tension vs log Concentration plots for  $C_{12}E_6$ /PES surfactant mixture at 303 K. •- 1:1,  $C_{12}E_6$ :PES;  $\Delta$ - 3:7,  $C_{12}E_6$ :PES; x - 7:3,  $C_{12}E_6$ :PES; ■- 1:9,  $C_{12}E_6$ :PES; ▲- 9:1,  $C_{12}E_6$ :PES.

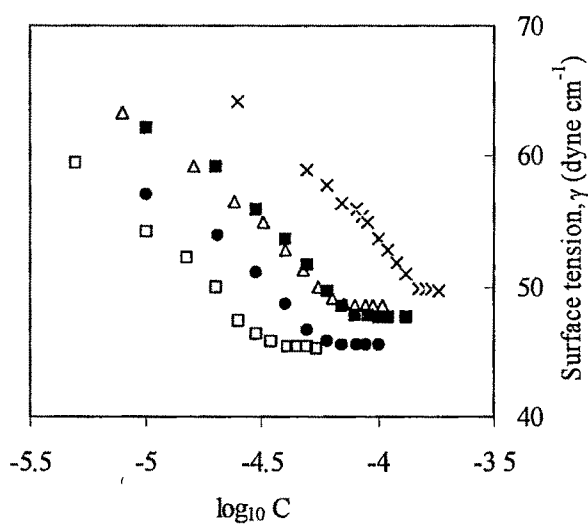


Figure III.II : Surface tension vs log Concentration plots for  $C_{12}E_6$ /PES surfactant mixture at 308 K.  $\Delta$ - 1:1,  $C_{12}E_6$ :PES; ■- 3:7,  $C_{12}E_6$ :PES; •- 7:3,  $C_{12}E_6$ :PES; x - 1:9,  $C_{12}E_6$ :PES; □- 9:1,  $C_{12}E_6$ :PES.

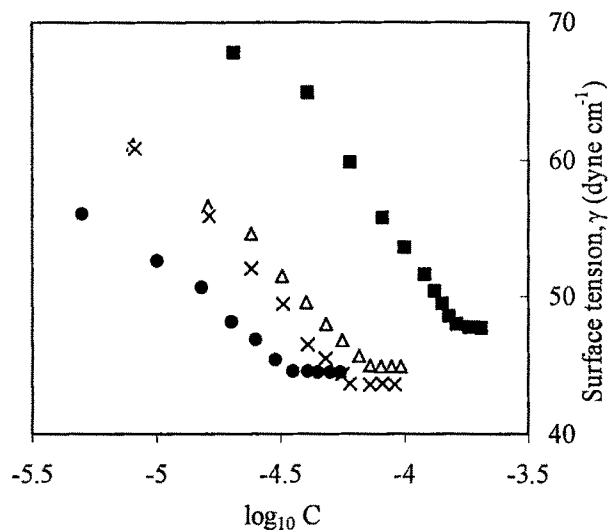


Figure III.III : Surface tension vs log Concentration plots for  $C_{12}E_6$ /PES surfactant mixture at 313 K.  $\Delta$ - 1:1,  $C_{12}E_6$ :PES,  $x$ -7:3,  $C_{12}E_6$ :PES;  $\blacksquare$  - 1:9,  $C_{12}E_6$ :PES;  $\bullet$ - 9:1,  $C_{12}E_6$ :PES.

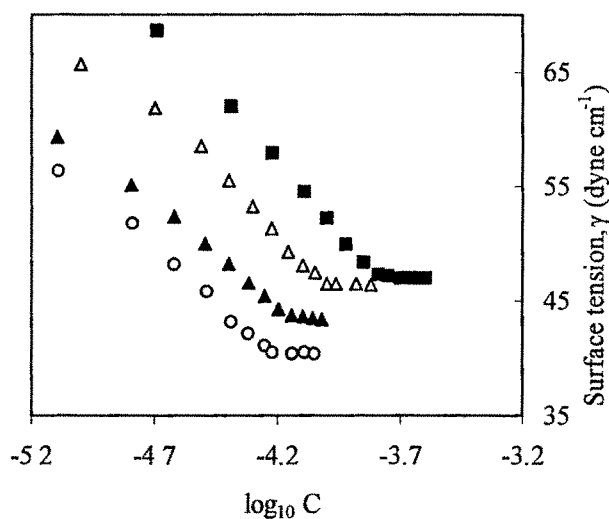


Figure III.IV : Surface tension vs log Concentration plots for  $C_{12}E_6$ /PES surfactant mixture at 318 K.  $\blacktriangle$ - 1:1,  $C_{12}E_6$ :PES;  $\Delta$ - 3:7,  $C_{12}E_6$ :PES;  $o$  - 7:3,  $C_{12}E_6$ :PES;  $\blacksquare$  - 1:9,  $C_{12}E_6$ :PES.



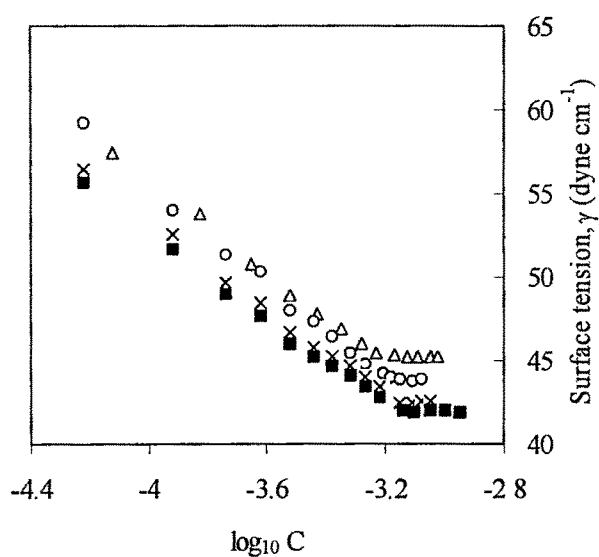


Figure III. V : Surface tension vs log Concentration plots for PES at different temperatures.  $\Delta$ - 303 K;  $\circ$ - 308 K;  $\times$ - 313 K;  $\blacksquare$ - 318 K.

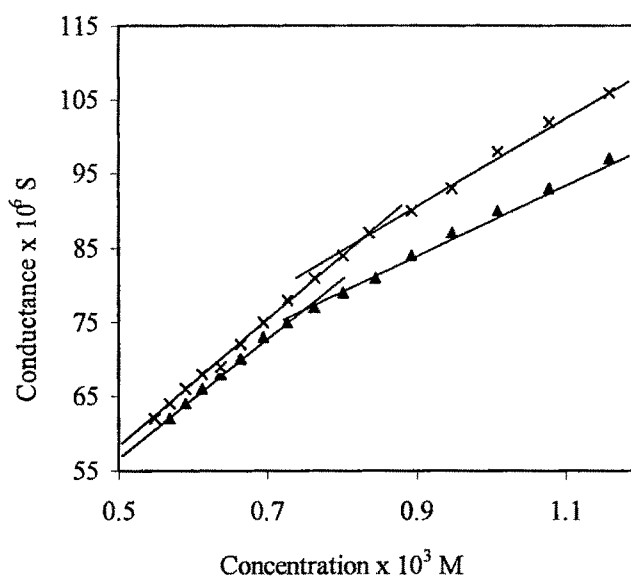


Figure III. VI : Conductance vs concentration of surfactant plots for PES at different temperatures  $\blacktriangle$ - PES at 308 K,  $\times$ - PES at 313 K.

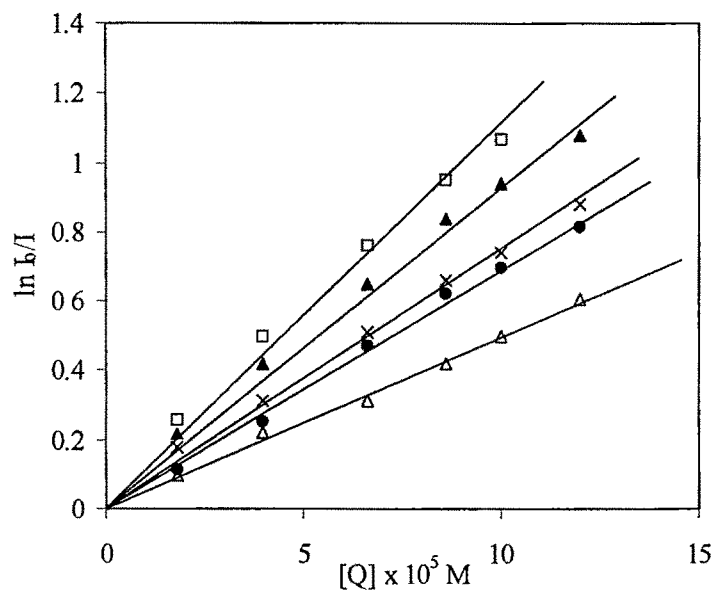


Figure III.VII · Plots of  $\ln I_0/I$  vs Cetyl Pyridinium Chloride Concentration  $[Q]$  for  $C_{12}E_6/PES$  mixed surfactant system.  $\blacktriangle$ -  $C_{12}E_6$ ;  $\times$ -7:3,  $C_{12}E_6:PES$ ;  $\bullet$ - 1:9,  $C_{12}E_6$  PES;  $\square$ - 9:1,  $C_{12}E_6$ : PES,  $\Delta$ - PES.

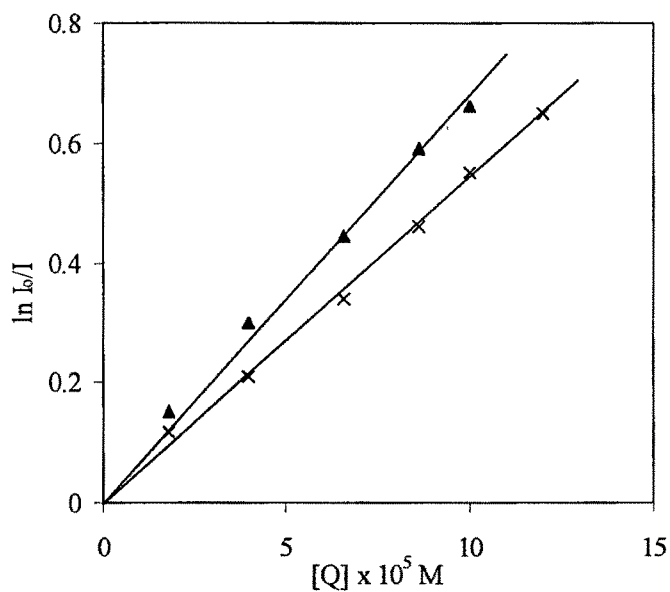


Figure III.VIII : Plots of  $\ln I_0/I$  vs Cetyl Pyridinium Chloride Concentration  $[Q]$  for  $C_{12}E_6/PES$  mixed surfactant system.  $\blacktriangle$ - 1:1  $C_{12}E_6:PES$ ;  $\times$ -3:7,  $C_{12}E_6:PES$ .

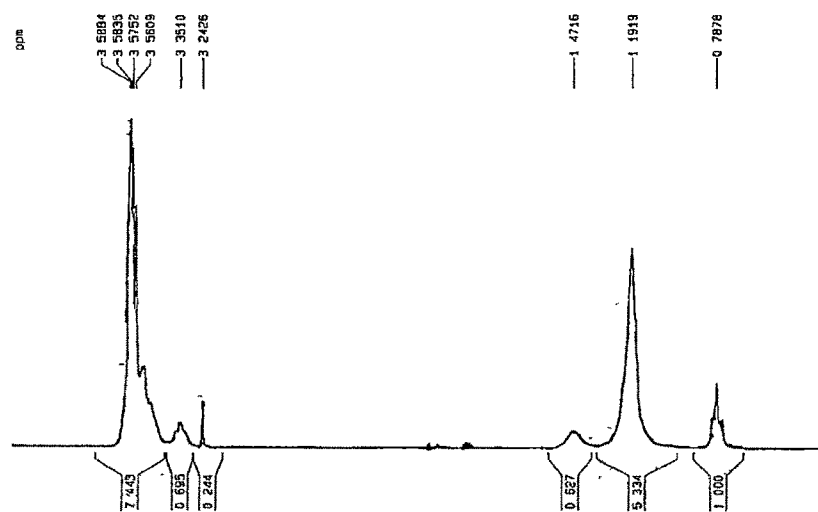


Figure III IX : <sup>1</sup>H NMR spectra of C<sub>12</sub>E<sub>6</sub>

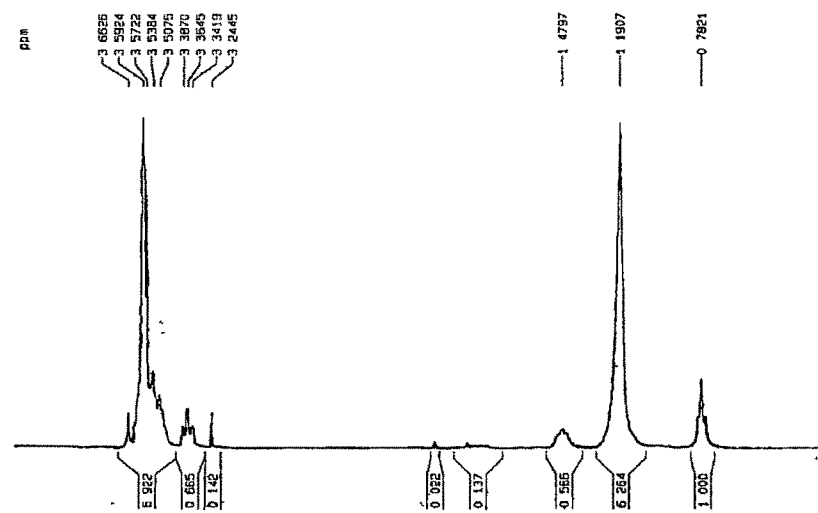


Figure III.X . <sup>1</sup>H NMR spectra of 9:1, C<sub>12</sub>E<sub>6</sub>: PES.

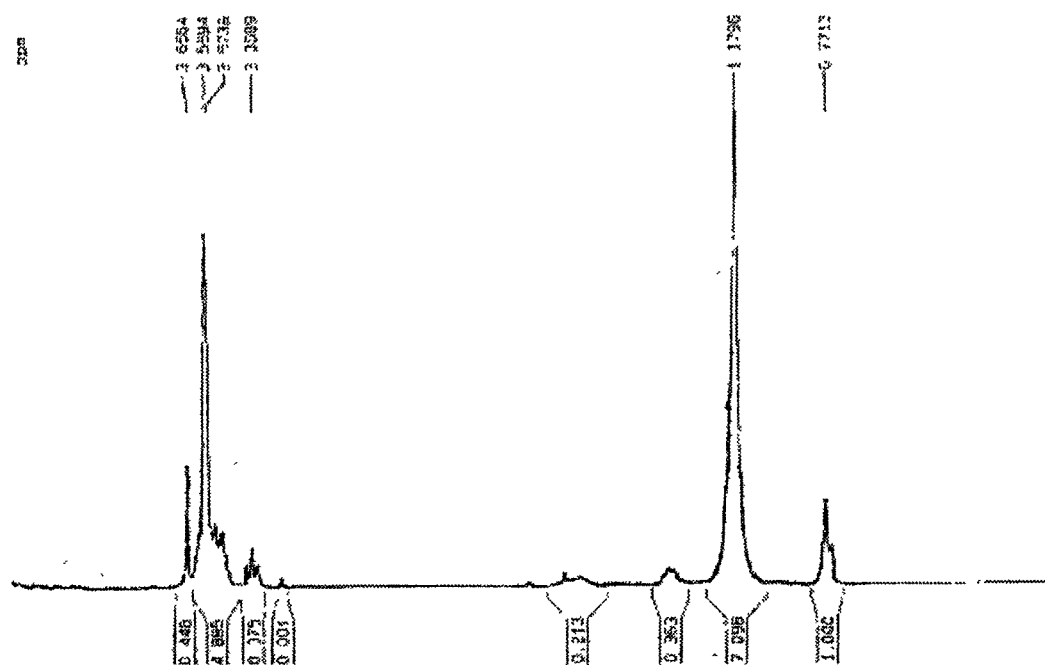


Figure III. XI:  $^1\text{H}$  NMR spectra of 7:3,  $\text{C}_{12}\text{E}_6$  : PES.

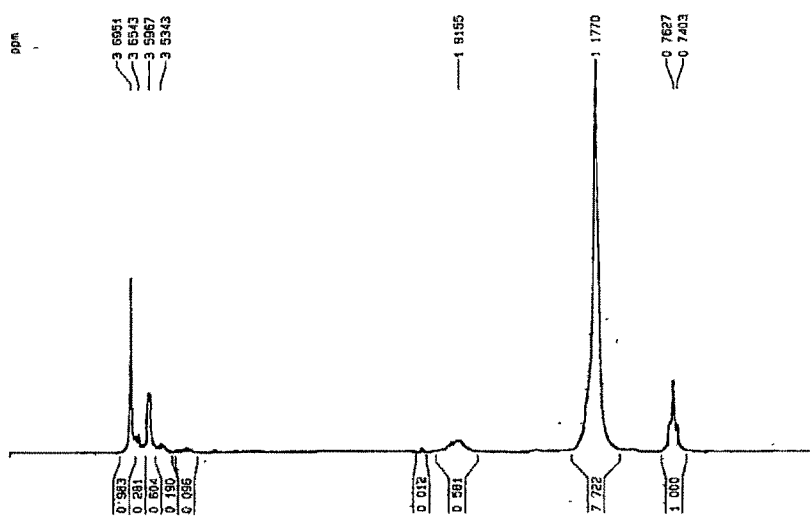


Figure III. XII:  $^1\text{H}$  NMR spectra of 1:9,  $\text{C}_{12}\text{E}_6$  : PES.

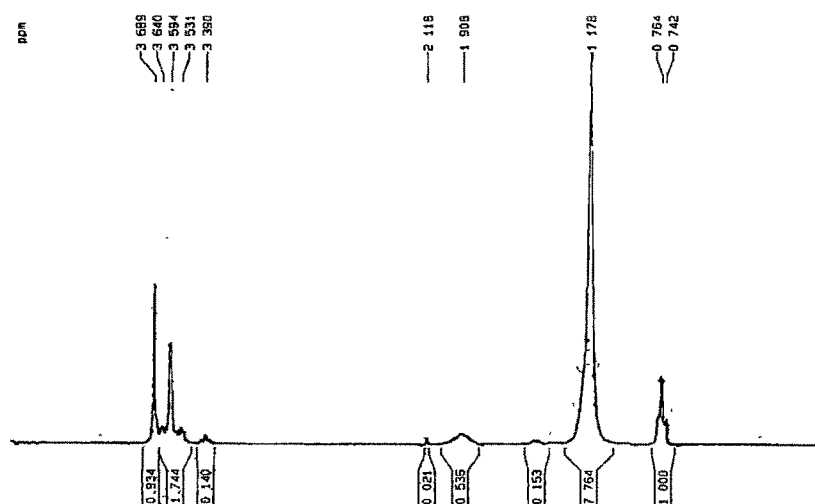
Figure III. XIII:  $^1\text{H}$  NMR spectra of 3:7,  $\text{C}_{12}\text{E}_6$  : PES.

Table III. I: Average flow times for different surfactant systems (Total Concentration 5%w/v) at different temperatures.

System	Average flow time (sec) at different temperatures			
	303	308	313	318 K
Water	86.2	78.3	71.5	65.3
$\text{C}_{12}\text{E}_6$	262.7	332.6	420.3	505.9
PES	127.9	115.8	105.4	95.7
9:1 $\text{C}_{12}\text{E}_6$ :PES	148.5	162.9	170.7	180.4
7:3 $\text{C}_{12}\text{E}_6$ : PES	134.7	122.3	109.7	100
3:7 $\text{C}_{12}\text{E}_6$ : PES	134.0	121.5	110.6	100.9
1:9 $\text{C}_{12}\text{E}_6$ : PES	134.2	120	109.4	99.6
1:1 $\text{C}_{12}\text{E}_6$ : PES	134.7	122.0	109.5	99.7

## Basic Data of Chapter IV

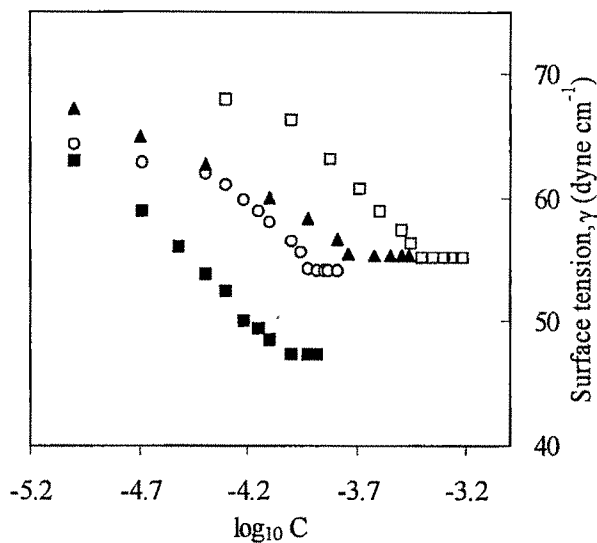


Figure IV.I Surface tension vs log Concentration plots for  $C_{12}E_9$ /MES surfactant mixture at 303 K.  $\circ$  - 1:1,  $C_{12}E_9$ :MES;  $\blacktriangle$  - 3:7,  $C_{12}E_9$ :MES;  $\square$  - 1:9,  $C_{12}E_9$ :MES;  $\blacksquare$  - 9:1,  $C_{12}E_9$ :MES.

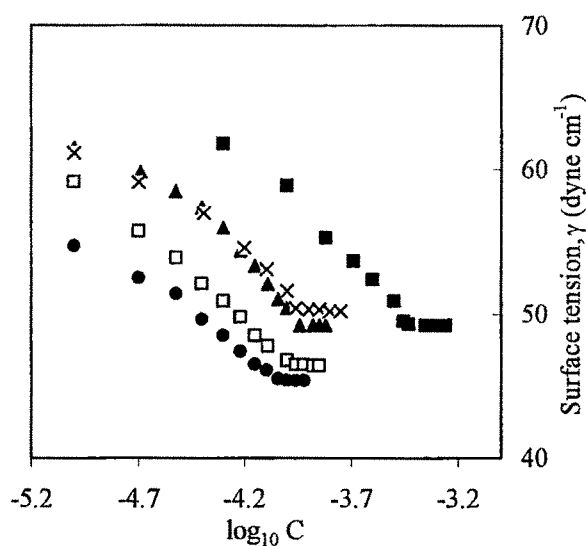


Figure IV.II : Surface tension vs log Concentration plots for  $C_{12}E_9$ /MES surfactant mixture at 308 K.  $\blacktriangle$  - 1:1,  $C_{12}E_9$ :MES;  $\times$  - 3:7,  $C_{12}E_9$ :MES;  $\square$  - 7:3  $C_{12}E_9$ :MES;  $\bullet$  - 1:9,  $C_{12}E_9$ :MES;  $\circ$  - 9:1,  $C_{12}E_9$ :MES.

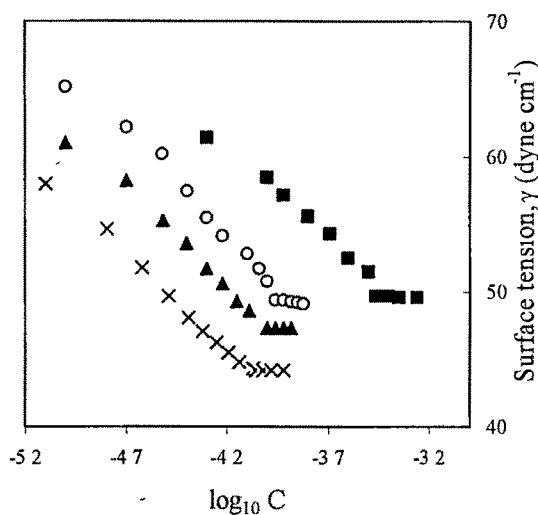


Figure IV. III . Surface tension vs log Concentration plots for  $C_{12}E_9$ /MES surfactant mixture at 313 K. o - 1:1,  $C_{12}E_9$ .MES, ▲ -7:3  $C_{12}E_9$ .MES, ■ - 1:9,  $C_{12}E_9$ .MES; x - 9:1,  $C_{12}E_9$  MES

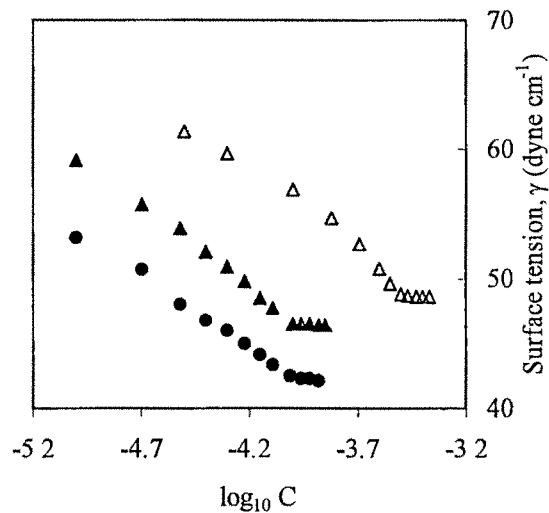


Figure IV IV : Surface tension vs log Concentration plots for  $C_{12}E_9$ /MES surfactant mixture at 318 K. ● - 7:3,  $C_{12}E_9$ .MES; ▲ -3:7  $C_{12}E_9$ .MES; Δ - 1:9,  $C_{12}E_9$ .MES.

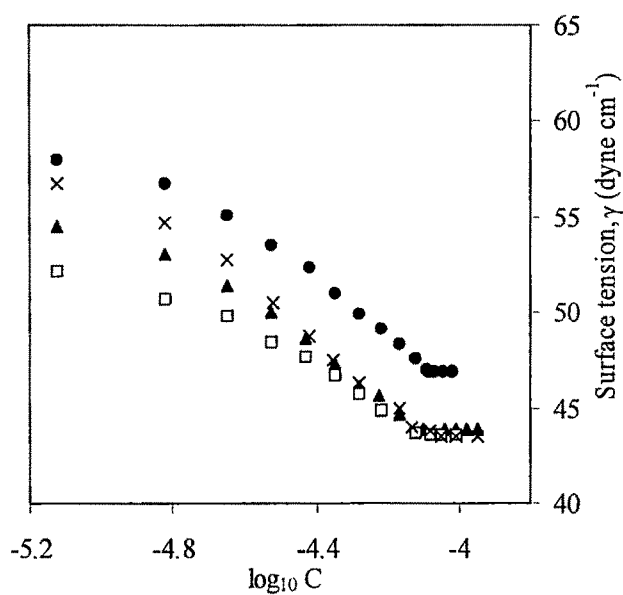


Figure IV.V : Surface tension vs log Concentration plots for  $\text{C}_{12}\text{E}_9$  at different temperatures •- 303 K; ▲- 308 K, □-313 K; x- 318 K.

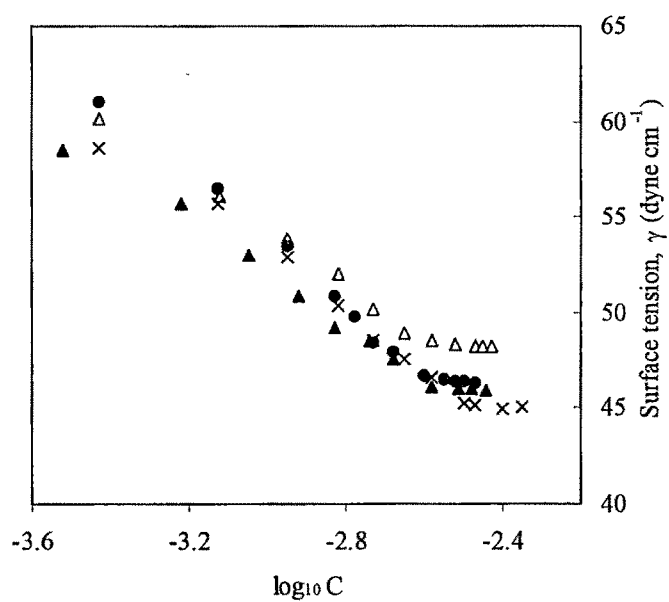


Figure IV.VI: Surface tension vs log Concentration plots for MES at different temperatures.  $\Delta$ - 303 K; •- 308 K, ▲-313 K; x- 318 K.



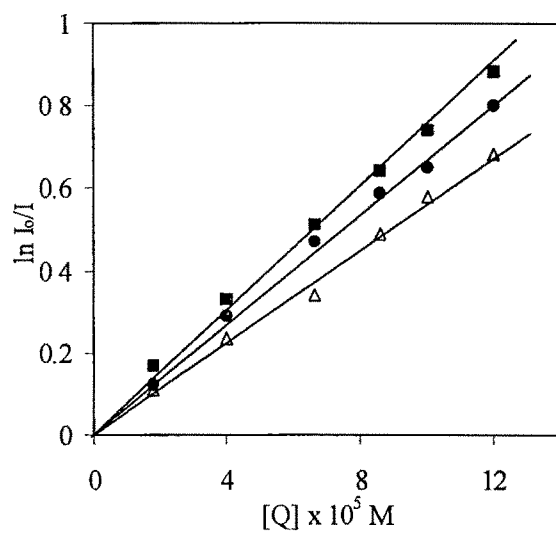


Figure IV.VII : Plots of  $\ln I_0/I$  vs Cetyl pyridinium chloride Concentration  $[Q]$  for  $C_{12}E_9/MES$  mixed surfactant system. ■ - 3:7,  $C_{12}E_9:MES$ ;  $\Delta$ -7:3,  $C_{12}E_9:MES$ ; ●-9:1,  $C_{12}E_9:MES$ .

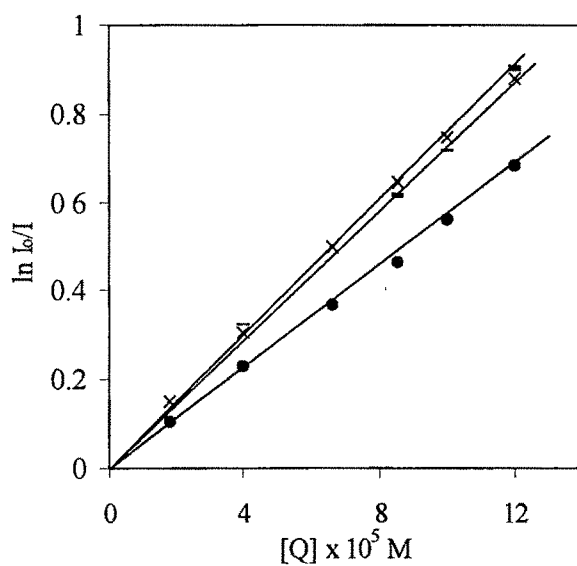


Figure IV.VIII : Plots of  $\ln I_0/I$  vs Cetyl pyridinium chloride Concentration  $[Q]$  for  $C_{12}E_9/MES$  mixed surfactant system. ●- 1:1,  $C_{12}E_9:MES$ ; x  $C_{12}E_9$ ; ■ - 1:9,  $C_{12}E_9:MES$ .

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Table IV I: Average flow times for different surfactant systems (Total Concentration 5%w/v) at different temperatures.

System	Average flow time (sec) at different temperatures			
	303	308	313	318 K
Water	86.2	78.3	71.5	65.3
C <sub>12</sub> E <sub>9</sub>	112.7	104.0	94.5	86.5
MES	125.2	113.1	120.7	93.9
9:1 C <sub>12</sub> E <sub>9</sub> :MES	110.5	101.6	92.8	84.7
7:3 C <sub>12</sub> E <sub>9</sub> :MES	124.7	113.7	102.5	94.7
3:7 C <sub>12</sub> E <sub>9</sub> :MES	124.7	113.0	104.9	94.7
1:9 C <sub>12</sub> E <sub>9</sub> :MES	131.6	119.6	107.0	95.0
1:1 C <sub>12</sub> E <sub>9</sub> :MES	123.5	114.2	105.1	94.9

## Basic Data of Chapter V

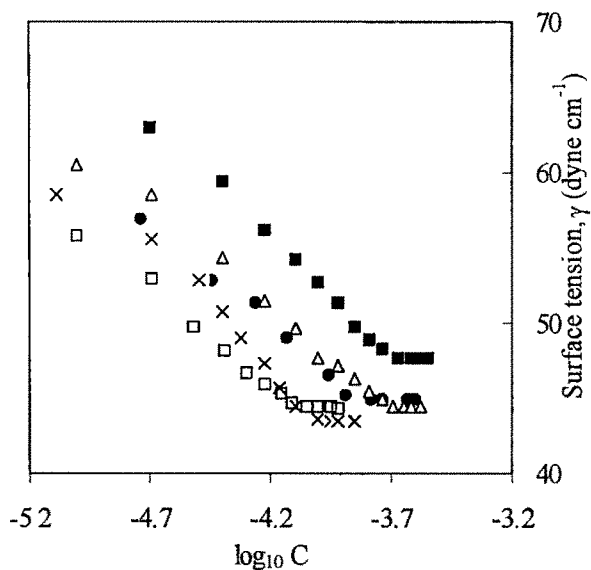


Figure V.I : Surface tension vs log Concentration plots for  $C_{12}E_9$ /PES surfactant mixture at 303 K. ●-1:1,  $C_{12}E_9$ :PES; Δ-3:7,  $C_{12}E_9$ :PES; x -7:3,  $C_{12}E_9$ :PES; ■- 1:9,  $C_{12}E_9$ :PES; □- 9:1,  $C_{12}E_9$ :PES.

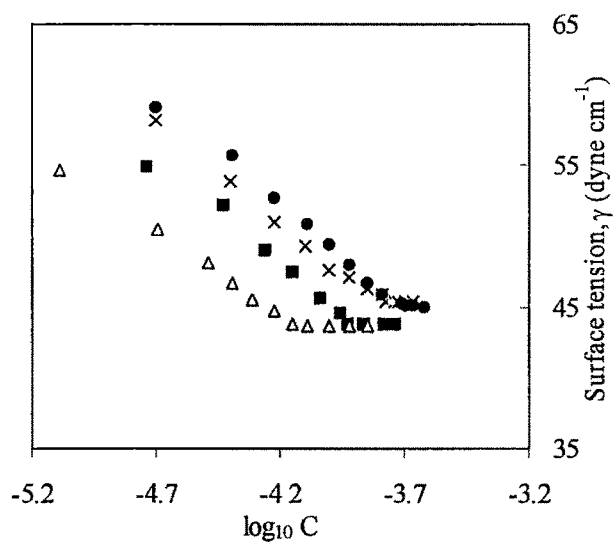


Figure V.II : Surface tension vs log Concentration plots for  $C_{12}E_9$ /PES surfactant mixture at 308 K. ■-1:1,  $C_{12}E_9$ :PES; x - 3:7,  $C_{12}E_9$ :PES; Δ-7:3,  $C_{12}E_9$ :PES; ●-1:9,  $C_{12}E_9$ :PES.

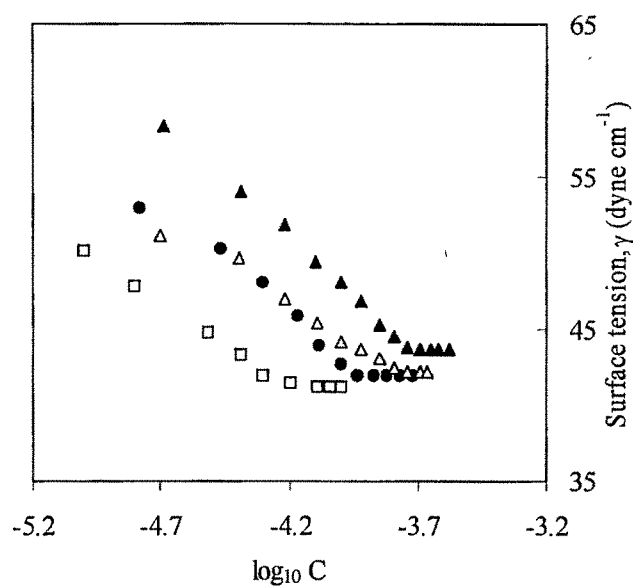


Figure V.III : Surface tension vs log Concentration plots for  $C_{12}E_9$ /PES surfactant mixture at 313 K. ●-1:1,  $C_{12}E_9$ :PES, Δ-3:7,  $C_{12}E_9$ :PES; ▲-1:9,  $C_{12}E_9$ :PES; □- 9:1,  $C_{12}E_9$ :PES.

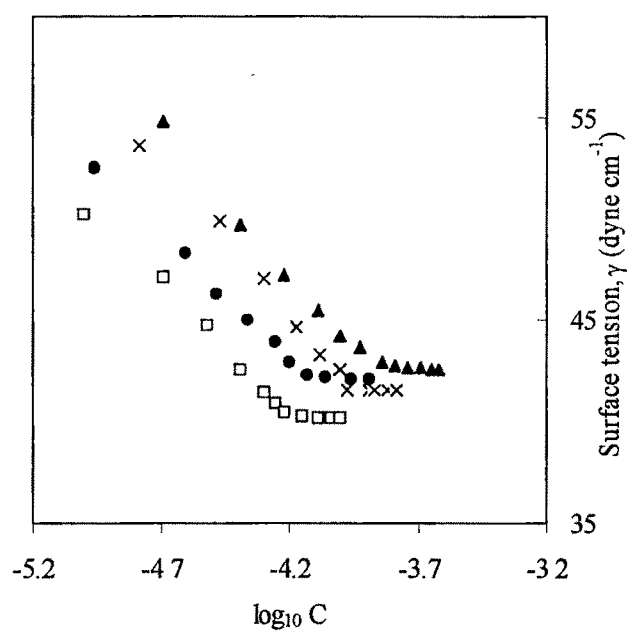


Figure V.IV : Surface tension vs log Concentration plots for  $C_{12}E_9$ /PES surfactant mixture at 318 K. x-1:1,  $C_{12}E_9$ :PES; ▲-3:7,  $C_{12}E_9$ :PES, ● 7:3,  $C_{12}E_9$ :PES, □- 9:1,  $C_{12}E_9$ :PES.

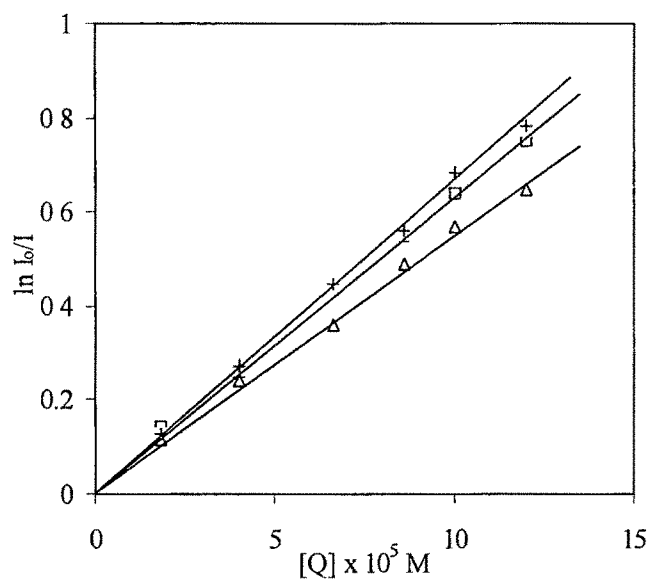


Figure V V : Plots of  $\ln I_0/I$  vs Cetyl pyridinium chloride Concentration  $[Q]$  for  $C_{12}E_9$ /PES mixed surfactant system.  $\square$ - 1:1,  $C_{12}E_9$ :PES;  $\Delta$ -1.9,  $C_{12}E_9$ :PES;  $+$  - 7:3,  $C_{12}E_9$ :PES.

Table V. I: Average flow times for different surfactant systems (Total Concentration 5%w/v) at different temperatures.

System	Average flow time (sec) at different temperatures			
	303	308	313	318 K
Water	86.2	78.3	71.5	65.3
$C_{12}E_9$	112.7	104.0	94.5	86.5
PES	127.9	115.8	105.4	95.7
9:1 $C_{12}E_9$ :PES	117.5	105.2	97.7	89.8
7:3 $C_{12}E_9$ :PES	129.1	115.5	102.5	95.2
3:7 $C_{12}E_9$ :PES	128.5	115.7	106.5	96.4
1:9 $C_{12}E_9$ :PES	132.1	120.3	108.8	99.8
1:1 $C_{12}E_9$ :PES	126.7	115.9	105.9	95.2

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**Basic Data of Chapter VI A**

Table VI.A.I. The values of cloud point, CP ( °C) of  $C_{12}E_n$  surfactants in presence of KX.  
(where X = Cl<sup>-</sup> or Br<sup>-</sup> or I<sup>-</sup>)

KX (M)	$C_{12}E_6$ (1%w/v)			$C_{12}E_9$ (1%w/v)		
	KCl	KBr	KI	KCl	KBr	KI
0.0	46.5	46.5	46.5	85.0	85.0	85.0
0.5	39.6	44.2	48.4	77.4	79.6	89.0
1.0	34.4	42.0	51.4	69.0	75.4	90.8
1.5	29.8	38.2	53.8	63.2	72.4	93.0
2.0	26.2	36.4	55.4	58.6	69.6	94.4
2.5	23.0	35.0	56.4	53.8	67	95.1

## Basic Data of Chapter VI B

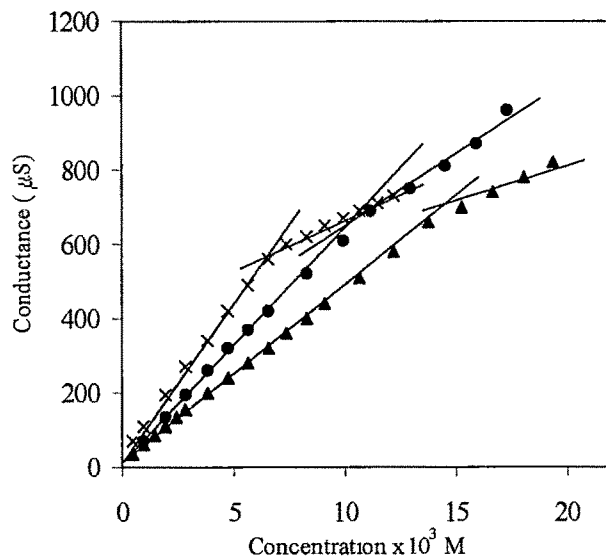


Figure VI B I . Conductivity vs concentration plots for TTAB at  $35^\circ\text{C}$  in aquo-DMF media x- 10%DMF, ●-30% DMF; ▲- 40% DMF.

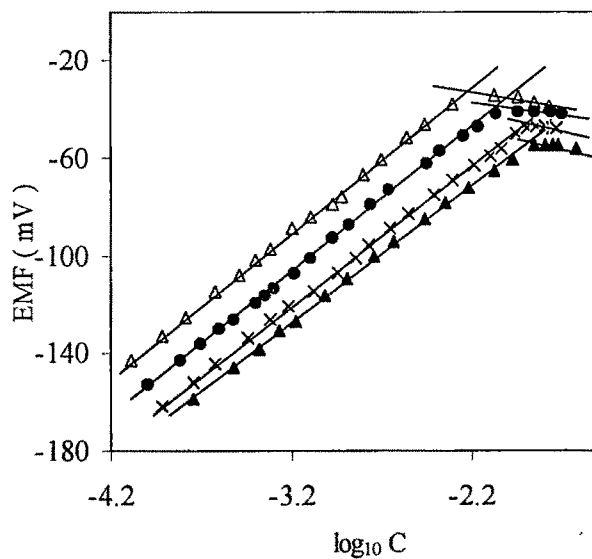


Figure VI.B.II . EMF vs  $\log_{10}$  Concentration plots for TTAB at  $35^\circ\text{C}$  in aquo-DMF media.  $\Delta$ - 10%DMF; ●- 20%DMF; x-30% DMF; ▲- 40% DMF.

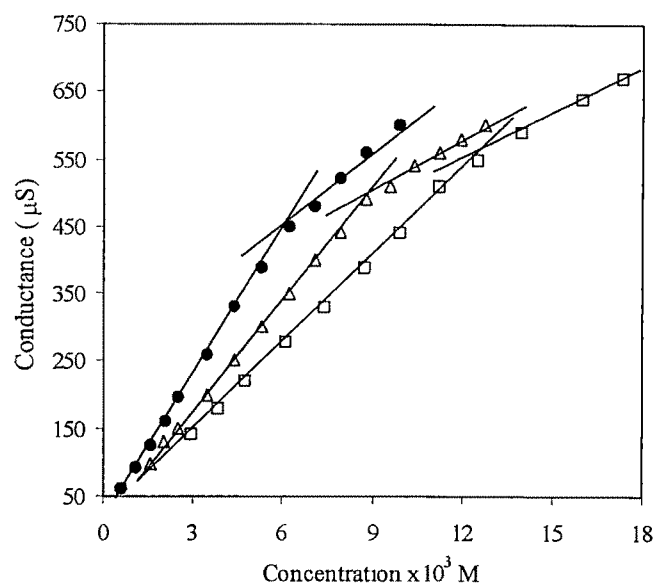


Figure VI.B.III . Conductivity vs concentration plots for TTAB at 35°C in aquo-DMSO media x- 20%DMSO, Δ-30% DMSO; □- 40% DMF.

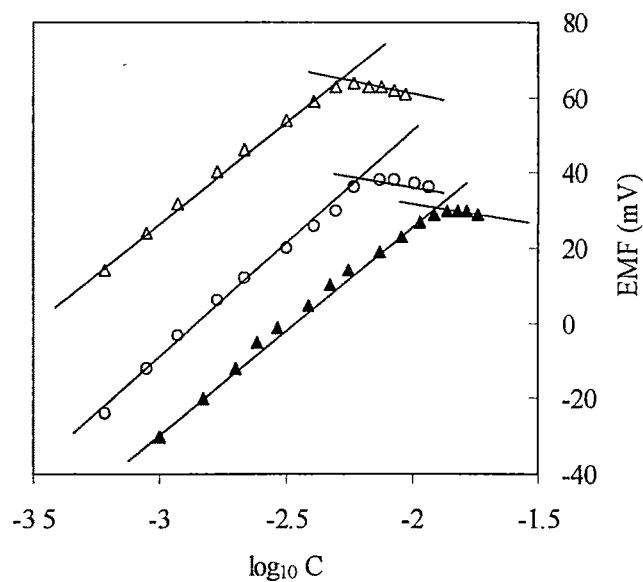


Figure VI B.IV : EMF vs  $\log_{10}$  Concentration plots for TTAB at 35°C in aquo-DMSO media. Δ- 10%DMSO; o - 20%DMSO, ▲ - 40% DMSO.