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## **APPENDICES**

## APPENDIX A

**Table A1** Average thickness of different film coated on glass slide

Substrate	Exp1 (nm)			Exp2 (nm)			Surface thickness (nm)
	(PDAD/PSS) <sub>10</sub>	266.500	271.660	278.740	264.490	266.310	
(PDAD/gelatin) <sub>10</sub>	71.828	75.462	72.049	72.047	71.828	75.462	73.113 ± 1.8
(chitosan/gelatin) <sub>10</sub>	151.350	151.550	154.280	146.030	149.46	148.460	150.188 ± 2.8

**Table A2** Average thickness of film coated by PDAD/gelatin on glass slide

Number of layers	Surface thickness (nm)	SD
(PDAD/gelatin) <sub>2</sub>	19.284	1.59
(PDAD/gelatin) <sub>4</sub>	26.045	1.73
(PDAD/gelatin) <sub>6</sub>	46.887	1.87
(PDAD/gelatin) <sub>8</sub>	62.819	4.76
(PDAD/gelatin) <sub>10</sub>	73.113	2.04

**Table A3** Average loss of thickness of film coated by PDAD/gelatin on glass slide  
immerse in medium solution

Time (hr)	Loss of Surface thickness (nm)
0	52.000
4	49.000
8	47.000
24	47.000
48	45.000

**Table A4** Average loss of thickness of film coated by chitosan/gelatin on glass slide  
immerse in medium solution

<b>Time (hr)</b>	<b>Loss of Surface thickness (nm)</b>
0	142.000
4	131.000
8	88.000
24	77.000
48	62.000



## APPENDIX B

**Table B1** Average contact angle of PEMs coated by PDAD/gelatin solution on the glass slide

<b>Number of layers</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Contact angle</b>	<b>SD</b>
0	35.21	29.15	33.51	30.36	29.13	31.47	2.75
1	55.29	54.47	61.92	54.86	55.37	56.38	3.12
2	63.9	68.25	72.26	65.26	70	67.93	3.41
3	45.51	42.11	53.43	40.75	42.93	44.95	5.05
4	59.24	60.64	63.5	68.98	63.85	63.24	3.75
5	39.23	37.4	40.52	39.09	45.34	40.32	3.02
6	74.23	75.27	70.86	69.84	75.94	73.23	2.72
7	66.06	54.86	47.44	63.44	50.77	56.51	8.02
8	80.55	79.27	73.91	75.26	79.38	77.67	2.90
9	52.65	50.79	46.26	53.41	46.74	49.97	3.31
10	78.97	70.9	80.17	82.18	84.92	79.43	5.27
11	48.39	45.29	58.08	55.55	47.96	51.05	5.47
12	80.89	81.39	79.5	74.62	80.57	79.39	2.76
13	41.57	45.44	47.85	45.68	45.4	45.19	2.27
14	79.55	73.18	78.41	73.74	74.17	75.81	2.94
15	47.69	45.58	47.18	43.65	51.42	47.10	2.88
16	80.56	71.51	71.73	83.91	77.04	76.95	5.44
17	46.85	44.25	43.61	49.06	41.27	45.01	3.01
18	80.06	82.27	83.54	76.05	76.4	79.66	3.38
19	50.48	42.76	43.06	47.58	43.81	45.54	3.37
20	83.55	84.64	78.21	82.88	79.4	81.74	2.78

**Table B2** Average contact angle of PEMs coated by chitosan/gelatin solution on the glass slide

Number of layers	1	2	3	4	Contact angle	SD
0	28.66	39.69	33.48	38.48	35.08	5.05
1	39.22	31.09	41.27	39.14	37.68	4.50
2	57.31	59.92	68.68	62.21	62.03	4.86
3	62.48	69.83	64.49	67.26	66.02	3.21
4	74.44	70.17	74.01	72.67	72.82	1.92
5	52.23	52.79	53.28	63.67	55.49	5.47
6	63.08	60.53	65.06	64.74	63.35	2.07
7	58.42	62.14	63.63	66.14	62.58	3.23
8	74.66	73.75	71.74	74.09	73.56	1.27
9	65.14	60.42	60.34	59.15	61.26	2.65
10	76.06	74.59	73.92	72.66	74.31	1.42
11	59.22	64.09	63.24	64.43	62.75	2.40
12	78.56	77.58	75.44	79.64	77.81	1.79
13	64.65	65.25	66.46	64.72	65.27	0.84
14	75.88	75.52	73.9	73.24	74.64	1.27
15	67.03	68.18	68.9	67.82	67.98	0.78
16	79.44	75.15	79.18	78.56	78.08	1.99
17	69.52	66.5	65.55	65.55	66.78	1.88
18	74.9	76.51	81.91	74.97	77.07	3.31
19	64.54	65.44	68.33	67.74	66.51	1.81
20	78.56	80.57	74.57	77.65	77.84	2.50

**Table B3** Average contact angle of PEMs coated by PDAD/gelatin solution on PCL film

Number of layers	1	2	3	4	Contact angle	SD
0	51.05	59.26	53.65	59.07	55.76	4.08
4	66.32	69.86	65	65.41	66.65	2.21
8	81.69	77.81	85.68	82.07	81.81	3.22
12	87.82	78.34	87.21	80.4	83.44	4.78
16	73.69	77.08	72.93	75.38	74.77	1.85
20	89.31	83.78	78.54	83.78	83.85	4.40

**Table B4** Average contact angle of PEMs coated by chitosan/gelatin solution on PCL film

Number of layers	1	2	3	4	Contact angle	SD
0	51.05	52.26	50	53.07	51.60	1.35
4	66.53	71.46	73.44	66.6	69.51	3.49
8	81.25	78.94	83.42	82.77	81.60	1.99
12	79.69	81.65	85.27	83.74	82.59	2.44
16	83.29	86.6	83.51	82.08	83.87	1.93
20	86.02	82.49	83.59	88.06	85.04	2.50

**Table B5** Average contact angle of PEMs coated by PDAD/gelatin after immerse in medium solution

Time (hr)	1	2	3	4	Contact angle	SD
0	86.74	86.09	86.68	86.32	86.46	0.31
4	87.86	85.06	86.06	85.55	86.13	1.22
8	79.08	80.69	80.64	84.47	81.22	2.29
24	84.17	83.42	73.33	83.25	81.04	5.16

**Table B6** Average contact angle of PEMs coated by chitosan/gelatin after immerse in medium solution

Time (hr)	1	2	3	4	Contact angle	SD
0	78.81	76.19	78.66	80.69	78.59	1.85
4	57.06	60.9	58.61	59.62	59.05	1.62
8	60.71	56.84	54.87	54.53	56.74	2.84
24	55.28	57	57.67	54.37	56.08	1.52

## APPENDIX C

**Table C1** Absorbance @ 570 nm of different types of polyelectrolyte solution in order to study the effect of outermost layer

4 hr						
	Black ground	1	2	3	Mean	SD
TCPS	0	0.258	0.268	0.158	0.228	0.061
(PDAD/PSS) <sub>4</sub>	0.028	0.239	0.249	0.196	0.228	0.028
(PDAD/PSS) <sub>4</sub> gel (+)	0.029	0.223	0.219	0.246	0.229	0.015
(PDAD/PSS) <sub>4</sub> gel(-)	0.028	0.253	0.233	0.288	0.258	0.028
(PDAD/PSS) <sub>4</sub> chi/gel	0.036	0.276	0.265	0.279	0.273	0.007
(PDAD/PSS) <sub>4</sub> chi	0.036	0.211	0.250	0.270	0.244	0.030
8 hr						
	Black ground	1	2	3	Mean	SD
TCPS	0	0.310	0.350	0.320	0.327	0.021
(PDAD/PSS) <sub>4</sub>	0.024	0.361	0.345	0.401	0.369	0.029
(PDAD/PSS) <sub>4</sub> gel (+)	0.022	0.356	0.342	0.382	0.360	0.020
(PDAD/PSS) <sub>4</sub> gel(-)	0.026	0.287	0.331	0.360	0.326	0.037
(PDAD/PSS) <sub>4</sub> chi/gel	0.028	0.376	0.410	0.289	0.358	0.062
(PDAD/PSS) <sub>4</sub> chi	0.026	0.410	0.360	0.397	0.389	0.026
24 hr						
	Black ground	1	2	3	Mean	SD
TCPS	0.023	0.450	0.460	0.465	0.458	0.008
(PDAD/PSS) <sub>4</sub>	0.023	0.470	0.493	0.470	0.478	0.013
(PDAD/PSS) <sub>4</sub> gel (+)	0.023	0.468	0.425	0.546	0.480	0.061
(PDAD/PSS) <sub>4</sub> gel(-)	0.024	0.445	0.464	0.568	0.492	0.066
(PDAD/PSS) <sub>4</sub> chi/gel	0.025	0.432	0.536	0.607	0.525	0.088
(PDAD/PSS) <sub>4</sub> chi	0.024	0.587	0.591	0.625	0.601	0.021
48 hr						
	Black ground	1	2	3	Mean	SD
TCPS	0	0.500	0.537	0.522	0.520	0.019
(PDAD/PSS) <sub>4</sub>	0.013	0.488	0.487	0.619	0.531	0.076
(PDAD/PSS) <sub>4</sub> gel (+)	0.014	0.522	0.511	0.635	0.556	0.069
(PDAD/PSS) <sub>4</sub> gel(-)	0.017	0.466	0.485	0.644	0.532	0.098
(PDAD/PSS) <sub>4</sub> chi/gel	0.012	0.533	0.581	0.658	0.591	0.063
(PDAD/PSS) <sub>4</sub> chi	0.018	0.464	0.637	0.796	0.632	0.166

**Table C2** Absorbance @ 570 nm of different types of polyelectrolyte solution in order to study the effect of number of layers

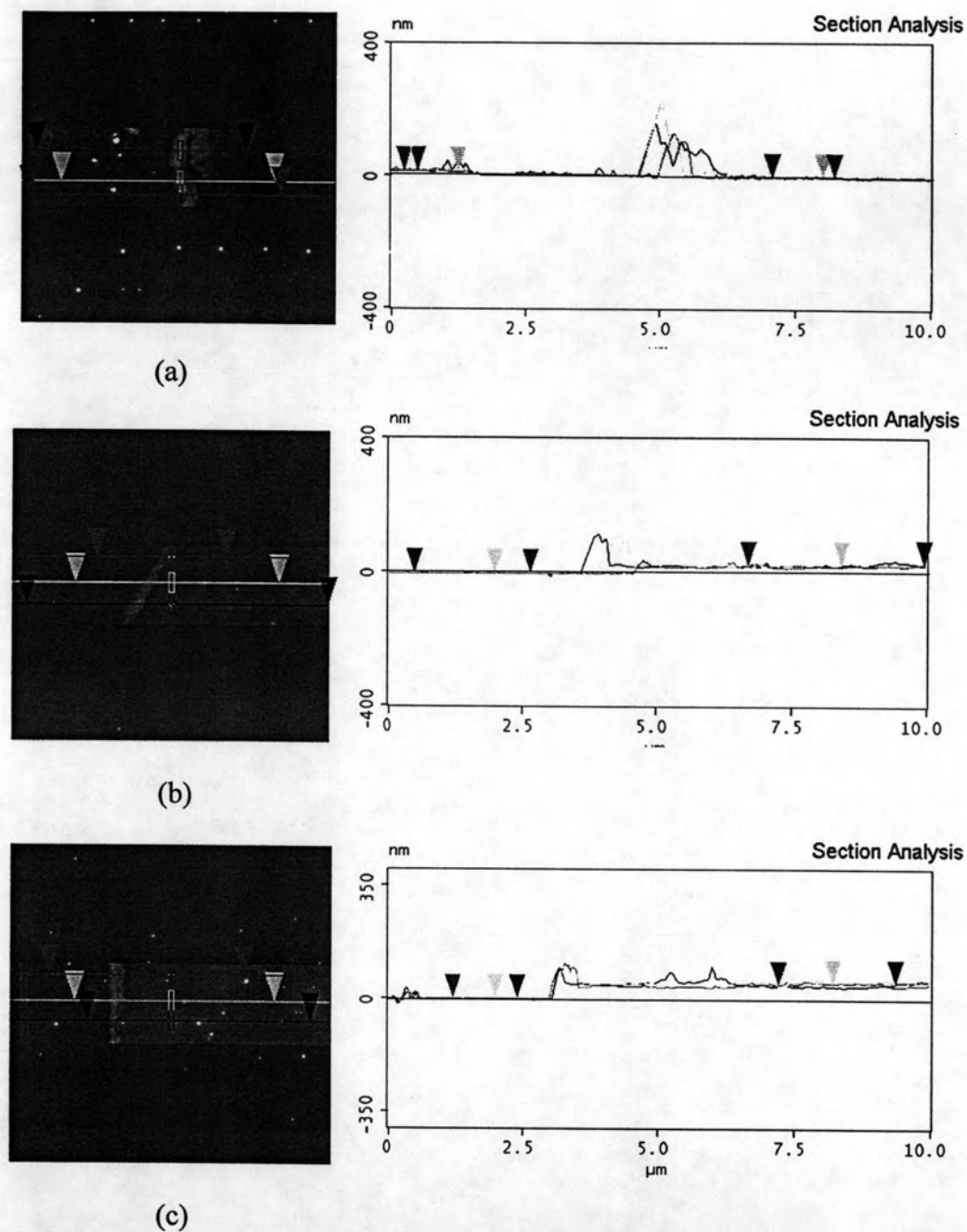
8 hr						
	Black ground	1	2	3	Mean	SD
TCPS		0.105	0.105	0.122	0.111	0.010
(PDAD/PSS) <sub>4</sub>	0.006	0.177	0.187	0.176	0.180	0.006
(PDAD/gel) <sub>4</sub>	0.005	0.166	0.149	0.107	0.141	0.030
(PDAD/gel) <sub>8</sub>	0.006	0.167	0.158	0.165	0.163	0.005
(chi/gel) <sub>4</sub>	0.007	0.062	0.069	0.070	0.067	0.004
(chi/gel) <sub>8</sub>	0.009	0.046	0.032	0.027	0.035	0.010
24 hr						
	Black ground	1	2	3	Mean	SD
TCPS		0.367	0.367	0.267	0.334	0.058
(PDAD/PSS) <sub>4</sub>	0.031	0.285	0.328	0.364	0.326	0.040
(PDAD/gel) <sub>4</sub>	0.022	0.339	0.333	0.350	0.341	0.009
(PDAD/gel) <sub>8</sub>	0.025	0.324	0.347	0.352	0.341	0.015
(chi/gel) <sub>4</sub>	0.025	0.220	0.188	0.122	0.177	0.050
(chi/gel) <sub>8</sub>	0.028	0.362	0.243	0.197	0.267	0.085
48 hr						
	Black ground	1	2	3	Mean	SD
TCPS		0.523	0.523	0.515	0.520	0.005
(PDAD/PSS) <sub>4</sub>	0.022	0.471	0.463	0.563	0.499	0.056
(PDAD/gel) <sub>4</sub>	0.016	0.462	0.464	0.500	0.475	0.021
(PDAD/gel) <sub>8</sub>	0.011	0.514	0.495	0.609	0.539	0.061
(chi/gel) <sub>4</sub>	0.012	0.469	0.490	0.590	0.516	0.065
(chi/gel) <sub>8</sub>	0.012	0.391	0.499	0.476	0.455	0.057



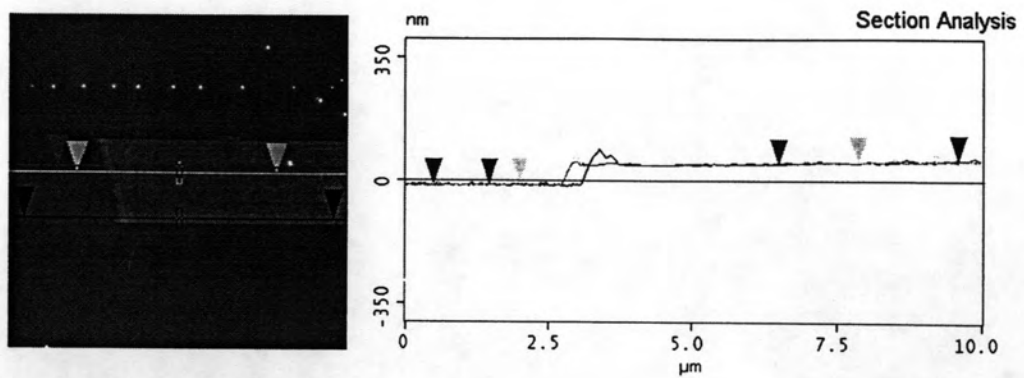
**Table C3** Absorbance @ 570 nm of different types of polyelectrolyte solution coated on PCL fiber.

4 hr						
	Black ground	1	2	3	Mean	SD
TCPS	0.012	0.291	0.301	-	0.296	0.007
blank	0.015	0.310	0.297	-	0.304	0.009
(PDAD /PSS ) <sub>4</sub>	0.009	0.287	0.305	-	0.296	0.013
(PDAD/gel) <sub>4</sub>	0.013	0.283	0.350	-	0.317	0.047
8 hr						
	Black ground	1	2	3	Mean	SD
TCPS	0.003	0.310	0.335	-	0.323	0.018
blank	0.004	0.341	0.364	-	0.353	0.016
(PDAD /PSS ) <sub>4</sub>	0.005	0.377	0.386	-	0.382	0.006
(PDAD/gel) <sub>4</sub>	0.004	0.395	0.401	-	0.398	0.004
24 hr						
	Black ground	1	2	3	Mean	SD
TCPS	0.009	0.350	0.389	-	0.370	0.028
blank	0.006	0.374	0.391	-	0.383	0.012
(PDAD /PSS ) <sub>4</sub>	0.005	0.408	0.406	-	0.407	0.001
(PDAD/gel) <sub>4</sub>	0.010	0.399	0.405	-	0.402	0.004
48 hr						
	Black ground	1	2	3	Mean	SD
TCPS		0.682	0.691	-	0.687	0.006
blank	0.010	0.666	0.708	-	0.687	0.030
(PDAD /PSS ) <sub>4</sub>	0.011	0.642	0.643	-	0.643	0.001
(PDAD/gel) <sub>4</sub>	0.010	0.694	0.726	-	0.710	0.023

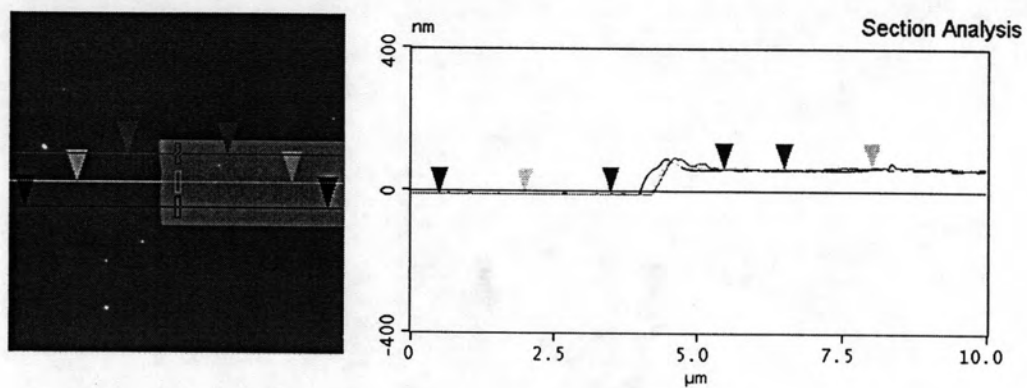
## APPENDIX D



**Figure D1** AFM images of surface topography. The corresponding two-dimensional topography is shown for (a) (PDAD/gelatin)<sub>4</sub> (b) (PDAD/gelatin)<sub>8</sub> (c) (PDAD/gelatin)<sub>12</sub>



(d)



(e)

**Figure D1 (cont.)** AFM images of surface topography. The corresponding two-dimensional topography is shown for (e) (PDAD/gelatin)<sub>16</sub> (b) (PDAD/gelatin)<sub>20</sub>

## BIOGRAPHY

Miss Paveenuch Kittitheeranun was born in Roi-Et, Thailand, on August 11, 1982. She received her Bachelor's degree in Science from Department of Materials Science, Faculty of Science, Chulalongkorn University in April 2005. For her master degree, she studied in Applied Polymer Science and Textile Technology Program at Department of Materials Science, Faculty of Science, Chulalongkorn University from June 2005 and completed the program in May 2007.

