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APPENDICES

Appendix A

Table 1A Conditions and results of each experiment.

Exp. no.	Type of mercury	DD of CTS (%)	Adsorbents weight (mg)	Int. Conc. (ppm)	Initial pH	Final pH	Temp. (°C)	Time (hrs)	Hg content (ppm)	% Removal
1	HgCl ₂	87	5	0.983	7.0	–	30	3	0.684	30.49
2	HgCl ₂	87	5	0.983	7.0	–	30	6	0.379	61.47
3	HgCl ₂	87	5	0.983	7.0	–	30	9	0.642	34.71
4	HgCl ₂	87	5	0.983	7.0	–	30	12	0.353	64.07
5	HgCl ₂	87	10	0.983	7.0	–	30	3	0.811	17.57
6	HgCl ₂	87	10	0.983	7.0	–	30	6	0.494	49.78
7	HgCl ₂	87	10	0.983	7.0	–	30	9	0.454	53.86
8	HgCl ₂	87	10	0.983	7.0	–	30	12	0.191	80.59
9	HgCl ₂	87	15	0.983	7.0	–	30	3	0.225	77.13
10	HgCl ₂	87	15	0.983	7.0	–	30	6	0.200	79.65
11	HgCl ₂	87	15	0.983	7.0	–	30	9	0.644	34.56
12	HgCl ₂	87	15	0.983	7.0	–	30	12	0.318	67.70
13	HgCl ₂	87	50	0.983	7.0	–	30	3	0.354	64.02
14	HgCl ₂	87	50	0.983	7.0	–	30	6	0.244	75.17
15	HgCl ₂	87	50	0.983	7.0	–	30	9	0.190	80.63
16	HgCl ₂	87	50	0.983	7.0	–	30	12	0.178	81.93
17	HgCl ₂	87	5	1.038	7.0	–	30	3	0.224	78.41
18	HgCl ₂	87	5	1.038	7.0	–	30	6	0.233	77.59
19	HgCl ₂	87	5	1.038	7.0	–	30	9	0.162	84.36
20	HgCl ₂	87	5	1.038	7.0	–	30	12	0.232	77.67
21	HgCl ₂	87	10	1.038	7.0	–	30	3	0.094	90.92
22	HgCl ₂	87	10	1.038	7.0	–	30	6	0.156	84.99
23	HgCl ₂	87	10	1.038	7.0	–	30	9	0.081	92.21
24	HgCl ₂	87	10	1.038	7.0	–	30	12	0.904	12.96
25	HgCl ₂	87	15	1.038	7.0	–	30	3	0.559	46.21
26	HgCl ₂	87	15	1.038	7.0	–	30	6	0.165	84.09

Table 1A Conditions and results of each experiment. (continued)

Exp. no.	Type of mercury	DD of CTS (%)	Adsorbents weight (mg)	Int. Conc. (ppm)	Initial pH	Final pH	Temp. (°C)	Time (hrs)	Hg content (ppm)	% Removal
27	HgCl ₂	87	15	1.038	7.0	–	30	9	0.073	92.94
28	HgCl ₂	87	15	1.038	7.0	–	30	12	0.058	94.45
29	HgCl ₂	87	50	1.038	7.0	–	30	3	0.341	67.12
30	HgCl ₂	87	50	1.038	7.0	–	30	6	0.035	96.60
31	HgCl ₂	87	50	1.038	7.0	–	30	9	0.408	60.75
32	HgCl ₂	87	50	1.038	7.0	–	30	12	0.393	62.17
33	HgCl ₂	87	5	1.038	7.0	–	50	3	0.221	78.69
34	HgCl ₂	87	10	1.082	7.0	–	30	3	0.357	67.01
35	HgCl ₂	87	10	1.082	7.0	–	30	6	0.155	85.65
36	HgCl ₂	87	10	1.082	7.0	–	30	6	0.139	87.14
37	HgCl ₂	87	10	0.992	7.0	–	30	3	0.220	77.81
38	HgCl ₂	87	10	0.992	7.0	–	30	3	0.252	74.57
39	HgCl ₂	87	10	0.992	7.0	–	30	3	0.197	80.11
40	HgCl ₂	87	10	0.992	7.0	–	30	6	0.175	82.41
41	HgCl ₂	87	10	0.992	7.0	–	30	6	0.067	93.24
42	HgCl ₂	87	10	0.992	7.0	–	30	6	0.075	92.46
43	HgCl ₂	87	10	0.992	7.0	–	30	9	0.040	95.94
44	HgCl ₂	87	10	0.992	7.0	–	30	9	0.140	85.89
45	HgCl ₂	87	10	0.992	7.0	–	30	9	0.193	80.53
46	HgCl ₂	87	10	0.992	7.0	–	30	12	0.027	97.24
47	HgCl ₂	87	10	0.992	7.0	–	30	12	0.101	89.82
48	HgCl ₂	87	10	0.992	7.0	–	30	12	0.143	85.61
49	HgCl ₂	87	10	0.965	7.0	–	30	9	0.0003	99.97
50	HgCl ₂	87	10	0.965	7.0	–	30	3	0.129	86.67
51	HgCl ₂	87	10	0.965	7.0	–	30	3	0.120	87.59
52	HgCl ₂	87	10	0.965	7.0	–	50	3	0.106	89.06

Table 1A Conditions and results of each experiment. (continued)

Exp. no.	Type of mercury	DD of CTS (%)	Adsorbents weight (mg)	Int. Conc. (ppm)	Initial pH	Final pH	Temp. (°C)	Time (hrs)	Hg content (ppm)	% Removal
53	HgCl ₂	87	10	0.965	7.0	–	50	3	0.191	80.18
54	HgCl ₂	87	10	1.089	7.0	–	30	6	0.136	87.53
55	HgCl ₂	87	10	1.089	7.0	–	30	6	0.018	98.39
56	HgCl ₂	87	10	1.089	7.0	–	30	9	0.059	94.54
57	HgCl ₂	87	10	1.089	7.0	–	30	9	0.092	91.56
58	HgCl ₂	87	10	1.089	7.0	–	30	12	0.051	95.35
59	HgCl ₂	87	10	1.089	7.0	–	30	3	0.247	77.36
60	HgCl ₂	87	10	1.089	7.0	–	30	3	0.146	86.58
61	HgCl ₂	87	10	1.089	7.0	–	30	3	0.238	78.15
62	HgCl ₂	87	10	1.089	7.0	–	50	3	0.256	76.55
63	HgCl ₂	87	10	1.089	7.0	–	50	3	0.116	89.32
64	HgCl ₂	87	10	1.089	7.0	–	50	3	0.303	72.22
65	HgCl ₂	87	10	10.35	5.0	–	30	3	4.387	57.62
66	HgCl ₂	87	10	10.35	5.0	–	30	3	4.621	55.36
67	HgCl ₂	87	10	10.35	5.0	–	30	3	4.543	56.11
68	HgCl ₂	87	10	10.35	6.0	–	30	3	6.522	37.00
69	HgCl ₂	87	10	10.35	6.0	–	30	3	6.327	38.88
70	HgCl ₂	87	10	10.35	6.0	–	30	3	6.489	37.32
71	HgCl ₂	87	10	10.35	7.0	–	30	3	6.786	34.45
72	HgCl ₂	87	10	10.35	7.0	–	30	3	6.839	33.94
73	HgCl ₂	87	10	10.35	7.0	–	30	3	6.915	33.20
74	PMA	87	10	10.21	6.0	–	30	3	7.278	29.69
75	PMA	87	10	10.21	6.0	–	30	3	7.053	31.87
76	PMA	87	10	10.21	6.0	–	30	3	7.205	30.40
77	PMA	87	10	10.21	7.0	–	30	3	7.150	30.93
78	PMA	87	10	10.21	7.0	–	30	3	7.226	30.20

Table 1A Conditions and results of each experiment. (continued)

Exp. no.	Type of mercury	DD of CTS (%)	Adsorbents weight (mg)	Int. Conc. (ppm)	Initial pH	Final pH	Temp. (°C)	Time (hrs)	Hg content (ppm)	% Removal
79	PMA	87	10	10.21	7.0	–	30	3	7.165	30.79
80	HgCl ₂	87	10	10.22	–	–	30	1	8.169	20.10
81	HgCl ₂	87	10	10.22	–	–	30	1	7.435	27.28
82	HgCl ₂	87	10	10.22	–	–	30	1	7.643	25.24
83	HgCl ₂	87	10	10.22	–	–	30	2	6.851	32.99
84	HgCl ₂	87	10	10.22	–	–	30	2	6.849	33.01
85	HgCl ₂	87	10	10.22	–	–	30	2	6.391	37.49
86	HgCl ₂	87	10	10.22	–	–	30	3	5.917	42.13
87	HgCl ₂	87	10	10.22	–	–	30	3	5.980	41.51
88	HgCl ₂	87	10	10.22	–	–	30	3	6.060	40.73
89	HgCl ₂	87	10	10.22	–	–	30	6	5.412	47.07
90	HgCl ₂	87	10	10.22	–	–	30	6	5.863	42.65
91	HgCl ₂	87	10	10.22	–	–	30	6	5.953	41.77
92	HgCl ₂	87	10	10.22	–	–	30	9	5.744	43.82
93	HgCl ₂	87	10	10.22	–	–	30	9	5.820	43.08
94	HgCl ₂	87	10	10.22	–	–	30	9	5.689	44.36
95	HgCl ₂	87	10	10.52	5.0	6.0	10	3	7.196	31.60
96	HgCl ₂	87	10	10.52	5.0	6.0	10	3	7.416	29.51
97	HgCl ₂	87	10	10.52	6.0	6.2	10	3	7.434	29.33
98	HgCl ₂	87	10	10.52	7.0	6.4	10	3	7.708	26.73
99	HgCl ₂	87	10	10.52	5.0	5.9	30	3	5.069	51.82
100	HgCl ₂	87	10	10.52	6.0	6.3	30	3	6.253	40.56
101	HgCl ₂	87	10	10.52	6.0	6.2	30	3	6.448	38.71
102	HgCl ₂	87	10	10.52	7.0	6.5	30	3	7.345	30.18
103	HgCl ₂	87	10	10.52	5.0	5.8	50	3	5.842	44.47
104	HgCl ₂	87	10	10.52	6.0	6.2	50	3	7.400	29.66

Table 1A Conditions and results of each experiment. (continued)

Exp. no.	Type of mercury	DD of CTS (%)	Adsorbents weight (mg)	Int. Conc. (ppm)	Initial pH	Final pH	Temp. (°C)	Time (hrs)	Hg content (ppm)	% Removal
105	HgCl ₂	87	10	10.52	7.0	6.4	50	3	7.432	29.35
106	PMA	87	10	10.39	5.0	5.8	10	3	7.251	30.21
107	PMA	87	10	10.39	6.0	6.2	10	3	7.617	26.69
108	PMA	87	10	10.39	6.0	6.1	10	3	7.569	27.15
109	PMA	87	10	10.39	7.0	6.5	10	3	7.725	25.65
110	PMA	87	10	10.39	5.0	6.0	30	3	7.798	24.95
111	PMA	87	10	10.39	6.0	6.2	30	3	6.845	34.12
112	PMA	87	10	10.39	7.0	6.3	30	3	7.549	27.34
113	PMA	87	10	10.39	7.0	6.4	30	3	7.612	26.74
114	PMA	87	10	10.39	5.0	6.1	50	3	6.794	34.61
115	PMA	87	10	10.39	6.0	6.3	50	3	6.857	34.00
116	PMA	87	10	10.39	7.0	6.4	50	3	7.287	29.87
117	HgCl ₂	79	10	10.44	5.0	6.0	10	3	7.968	23.68
118	HgCl ₂	79	10	10.44	6.0	6.2	10	3	8.222	21.25
119	HgCl ₂	79	10	10.44	7.0	6.3	10	3	8.497	18.61
120	HgCl ₂	79	10	10.44	5.0	5.6	30	3	5.082	51.32
121	HgCl ₂	79	10	10.44	6.0	6.1	30	3	6.773	35.12
122	HgCl ₂	79	10	10.44	6.0	6.0	30	3	6.859	34.30
123	HgCl ₂	79	10	10.44	6.0	6.2	30	3	6.766	35.19
124	HgCl ₂	79	10	10.44	7.0	6.3	30	3	7.562	27.57
125	HgCl ₂	79	10	10.44	5.0	5.5	50	3	5.986	42.66
126	HgCl ₂	79	10	10.44	6.0	6.1	50	3	7.302	30.06
127	HgCl ₂	79	10	10.44	7.0	6.2	50	3	8.241	21.06
128	PMA	79	10	10.16	5.0	5.6	10	3	7.015	30.95
129	PMA	79	10	10.16	5.0	5.7	10	3	7.288	28.27
130	PMA	79	10	10.16	5.0	5.6	10	3	7.374	27.42

Table 1A Conditions and results of each experiment. (continued)

Exp. no.	Type of mercury	DD of CTS (%)	Adsorbents weight (mg)	Int. Conc. (ppm)	Initial pH	Final pH	Temp. (°C)	Time (hrs)	Hg content (ppm)	% Removal
131	PMA	79	10	10.16	6.0	6.0	10	3	7.704	24.17
132	PMA	79	10	10.16	7.0	6.3	10	3	7.677	24.44
133	PMA	79	10	10.16	5.0	5.7	30	3	7.235	28.79
134	PMA	79	10	10.16	6.0	6.0	30	3	7.724	23.98
135	PMA	79	10	10.16	7.0	6.3	30	3	8.099	20.29
136	PMA	79	10	10.16	5.0	5.6	50	3	7.217	28.97
137	PMA	79	10	10.16	6.0	6.1	50	3	8.280	18.50
138	PMA	79	10	10.16	7.0	6.3	50	3	8.954	11.87
139	HgCl ₂	95	10	10.62	5.0	6.2	10	3	7.358	30.72
140	HgCl ₂	95	10	10.62	6.0	6.3	10	3	7.920	25.42
141	HgCl ₂	95	10	10.62	7.0	6.6	10	3	8.293	21.91
142	HgCl ₂	95	10	10.62	5.0	6.0	30	3	4.877	54.08
143	HgCl ₂	95	10	10.62	6.0	6.3	30	3	6.547	38.35
144	HgCl ₂	95	10	10.62	7.0	6.6	30	3	7.676	27.72
145	HgCl ₂	95	10	10.62	5.0	5.9	50	3	5.588	47.38
146	HgCl ₂	95	10	10.62	6.0	6.2	50	3	7.067	33.46
147	HgCl ₂	95	10	10.62	7.0	6.6	50	3	8.044	24.26
148	HgCl ₂	95	10	10.62	7.0	6.6	50	3	8.049	24.21
149	HgCl ₂	95	10	10.62	7.0	6.6	50	3	7.989	24.77
150	PMA	95	10	10.53	5.0	6.0	10	3	7.811	25.82
151	PMA	95	10	10.53	6.0	6.3	10	3	8.266	21.50
152	PMA	95	10	10.53	7.0	6.6	10	3	8.443	19.82
153	PMA	95	10	10.53	5.0	6.0	30	3	7.649	27.36
154	PMA	95	10	10.53	5.0	6.0	30	3	7.737	26.52
155	PMA	95	10	10.53	5.0	6.0	30	3	7.708	26.80
156	PMA	95	10	10.53	6.0	6.3	30	3	7.714	26.74

Table 1A Conditions and results of each experiment. (continued)

Exp. no.	Type of mercury	DD of CTS (%)	Adsorbents weight (mg)	Int. Conc. (ppm)	Initial pH	Final pH	Temp. (°C)	Time (hrs)	Hg content (ppm)	% Removal
157	PMA	95	10	10.53	7.0	6.5	30	3	8.421	20.03
158	PMA	95	10	10.53	5.0	5.9	50	3	7.728	26.61
159	PMA	95	10	10.53	6.0	6.3	50	3	7.942	24.58
160	PMA	95	10	10.53	7.0	6.5	50	3	7.777	26.14
161	HgCl ₂	87	10	10.28	6.0	6.2	30	3	6.337	38.36
162	HgCl ₂	87	10	10.28	7.0	6.3	30	3	6.635	35.46
163	HgCl ₂	87	10	10.28	7.0	6.3	50	3	7.702	25.08
164	HgCl ₂	87	10	10.28	7.0	6.4	50	3	7.692	25.18
165	HgCl ₂	87	10	10.28	7.0	6.3	50	3	7.711	24.99
166	HgCl ₂	87	10	10.28	7.0	6.4	50	3	7.702	25.07
167	HgCl ₂	87	10	10.28	7.0	6.3	50	3	7.705	25.05
168	HgCl ₂	87	10	10.28	6.0	6.2	30	24	6.225	39.45
169	HgCl ₂	95	10	10.28	6.0	6.3	10	3	7.241	29.56
170	HgCl ₂	95	10	10.28	7.0	6.5	10	3	7.520	26.85
171	HgCl ₂	95	10	10.28	7.0	6.4	30	3	6.555	36.24
172	PMA	79	10	10.70	7.0	6.3	10	3	8.561	19.99
173	PMA	79	10	10.70	6.0	6.2	50	3	7.672	28.30
174	PMA	87	10	10.70	5.0	6.0	30	3	7.235	32.38
175	PMA	95	10	10.70	5.0	6.1	10	3	7.487	30.03
176	PMA	95	10	10.70	6.0	6.2	10	3	7.811	27.00
177	PMA	95	10	10.70	7.0	6.4	10	3	8.020	25.05
178	PMA	95	10	10.70	5.0	6.0	30	3	7.140	33.27
179	PMA	95	10	10.70	6.0	6.3	30	3	7.372	31.10
180	PMA	95	10	10.70	7.0	6.4	30	3	7.673	28.29
181	PMA	95	10	10.70	5.0	6.1	50	3	6.853	35.95
182	PMA	95	10	10.70	6.0	6.2	50	3	7.010	34.48



Table 1A Conditions and results of each experiment. (continued)

Exp. no.	Type of mercury	DD of CTS (%)	Adsorbents weight (mg)	Int. Conc. (ppm)	Initial pH	Final pH	Temp. (°C)	Time (hrs)	Hg content (ppm)	% Removal
183	PMA	95	10	10.70	6.0	6.2	50	3	6.990	34.68
184	PMA	95	10	10.70	6.0	6.2	50	3	7.001	34.57
185	PMA	95	10	10.70	7.0	6.4	50	3	7.447	30.40
186	HgCl ₂	95	20	10.26	5.0	6.1	30	3	2.920	71.54
187	HgCl ₂	95	20	10.26	5.0	6.0	30	3	3.043	70.34
188	PMA	95	20	9.62	5.0	6.0	50	3	3.970	58.73
189	PMA	95	30	9.62	5.0	6.1	50	3	1.397	85.48
190	PMA	87	10	9.62	7.0	6.3	30	1	7.950	17.36
191	PMA	87	10	9.62	7.0	6.3	30	1	7.812	18.79
192	PMA	87	10	9.62	7.0	6.4	30	2	7.156	25.61
193	PMA	87	10	9.62	7.0	6.3	30	2	7.210	25.05
194	PMA	87	10	9.62	7.0	6.3	30	6	7.059	26.62
195	PMA	87	10	9.62	7.0	6.4	30	6	6.875	28.53
196	PMA	87	10	9.62	7.0	6.4	30	9	6.998	27.26
197	PMA	87	10	9.62	7.0	6.4	30	9	6.880	28.48
198	HgCl ₂	95	10	10.62	5.0	–	50	3	2.480	Desorbed
199	HgCl ₂	95	10	10.62	5.0	–	50	3	2.560	Desorbed
200	PMA	95	10	10.70	5.0	–	50	3	1.312	Desorbed
201	PMA	95	10	10.70	5.0	–	50	3	1.322	Desorbed
202	HgCl ₂	95	10	10.62	5.0	–	30	3	0.405	Digest ads.
203	HgCl ₂	95	10	10.62	5.0	–	30	3	0.444	Digest ads.
204	PMA	95	10	10.70	5.0	–	30	3	0.298	Digest ads.
205	PMA	95	10	10.70	5.0	–	30	3	0.342	Digest ads.

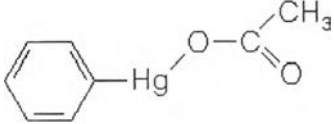
Appendix B

Table B – 1 Properties of Mercuric Chloride *

Formula	HgCl ₂
Chemical Name	Mercuric Chloride
Physical Properties	
Molecular Weight	271.52
Status at 25 °C	Solid
Color	White
Boiling Point (°C)	302
Melting Point (°C)	277
Specific Gravity	5.44
Solubility	Soluble in Water
Purity	> 99%
Supplier	Fluka

* From Encyclopedia of Chemical Engineering.

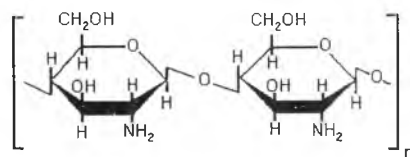
Table B – 2 Properties of Phenylmercuric Acetate *

Formula	$C_6H_5HgCOOCH_3$
Structure	
Chemical Name	Phenylmercuric Acetate
Physical Properties	
Molecular Weight	336.74
Status at 25 °C	Solid
Color	White
Boiling Point (°C)	-
Melting Point (°C)	149
Specific Gravity	5.44
Solubility	soluble in water about 1700 ppm
Purity	> 97%
Supplier	Fluka

* From Merck Index.

Table B – 3 Properties of Chitosan 79 % Degree of Deacetylation *

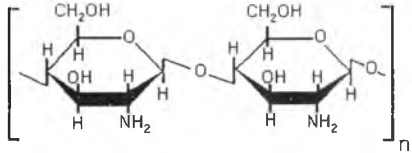
Structure



Chemical Name	poly (1→4)-2-amino-2-deoxy-β-D-glucan	
Appearance	Yellowish	
Particle Size	Mesh No.18	
Ash Content	0.55%	
Moisture Content	9.0%	
Deacetylation	79%	
Solution (1% in 1% acetic acid)		
Insoluble	0.93%	
Viscosity	696 cps	
Heavy Metal	0 ppm	
Microbial Content		
Total Plate Count	50 cfu/g	
Yeast & Mold	10 cfu/g	
E.coli & Salmonella	Nill	

* From Seafresh Chitosan (Lab) Co., Ltd.

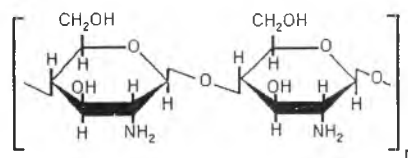
Table B – 4 Properties of Chitosan 87 % Degree of Deacetylation *

Structure		
Chemical Name	poly (1→ 4)-2-amino-2-deoxy-β-D-glucan	
Appearance	Yellowish	
Particle Size	Mesh No.18	
Ash Content	0.18%	
Moisture Content	9.0%	
Deacetylation	87%	
Solution (1% in 1% acetic acid)		
Insoluble	0.37%	
Viscosity	852 cps	
Heavy Metal	0 ppm	
Microbial Content		
Total Plate Count	50 cfu/g	
Yeast & Mold	20 cfu/g	
E.coli & Salmonella	Null	

* From Seafresh Chitosan (Lab) Co., Ltd.

Table B – 5 Properties of Chitosan 95 % Degree of Deacetylation *

Structure



Chemical Name	poly (1→ 4)-2-amino-2-deoxy-β-D-glucan	
Appearance	Yellowish	
Particle Size	Mesh No.18	
Ash Content	0.15%	
Moisture Content	9.0%	
Deacetylation	95%	
Solution (1% in 1% acetic acid)		
Insoluble	0.4%	
Viscosity	648 cps	
Heavy Metal	0 ppm	
Microbial Content		
Total Plate Count	10 cfu/g	
Yeast & Mold	10 cfu/g	
E.coli & Salmonella	Nill	

* From Seafresh Chitosan (Lab) Co., Ltd.

Table B – 6 Properties of Nitric Acid *

Formula	HNO ₃
Chemical Name	Nitric Acid
Physical Properties	
Molecular Weight	63.02
Status at 25 °C	Liquid
Color	Colorless
Boiling Point (°C)	83
Melting Point (°C)	- 41.59
Specific Gravity	1.502
Solubility	Soluble in Water
Purity	69.0 - 70.5%
Supplier	Merck

* From Merck Index.

Table B – 7 Properties of Sulfuric Acid *

Formula	H ₂ SO ₄
Chemical Name	Sulfuric Acid
Physical Properties	
Molecular Weight	98.09
Status at 25 °C	Liquid
Color	Colorless
Boiling Point (°C)	~ 290
Melting Point (°C)	10
Specific Gravity	1.84
Solubility	Soluble in Water
Purity	> 99%
Supplier	Merck

* From Merck Index.

Table B – 8 Properties of Hydrochloric Acid *

Formula	HCl
Chemical Name	Hydrochloric Acid
Physical Properties	
Molecular Weight	36.47
Status at 25 °C	Liquid
Color	Colorless
Boiling Point (°C)	- 15.35
Melting Point (°C)	- 83
Specific Gravity	5.44
Solubility	Soluble in Water and Alcohol
Purity	37%
Supplier	Merck

* From Encyclopedia of Chemical Engineering.

Table B – 9 Properties of Hydrofluoric Acid *

Formula	HF
Chemical Name	Hydrofluoric Acid
Physical Properties	
Molecular Weight	20.01
Status at 25 °C	Liquid
Color	Colorless
Boiling Point (°C)	112.2
Melting Point (°C)	- 83
Specific Gravity	1.155
Solubility	Soluble in Water
Purity	48 - 51%
Supplier	Carlo Erba

* From Encyclopedia of Chemical Engineering.

Table B – 10 Properties of Hydrogen Peroxide *

Formula	H ₂ O ₂
Chemical Name	Hydrogen Peroxide
Physical Properties	
Molecular Weight	34.02
Status at 25 °C	Liquid
Color	Colorless
Boiling Point (°C)	151.4
Melting Point (°C)	0.89
Specific Gravity	1.13
Solubility	Soluble in Water, Acid and Ether
Purity	35 – 35.6%
Supplier	Merck

* From Encyclopedia of Chemical Engineering.

Table B – 11 Properties of Potassium Permanganate *

Formula	KMnO ₄
Chemical Name	Potassium Permanganate
Physical Properties	
Molecular Weight	158.03
Status at 25 °C	Solid
Color	Dark Purple
Boiling Point (°C)	-
Melting Point (°C)	-
Specific Gravity	2.71
Solubility	Soluble in Water
Supplier	Carlo Erba

* From Merck Index.



Table B – 12 Properties of Potassium Persulfate *

Formula	K_2SO_8
Chemical Name	Potassium Persulfate
Physical Properties	
Molecular Weight	270.32
Status at 25 °C	Solid
Color	White
Boiling Point (°C)	-
Melting Point (°C)	-
Specific Gravity	-
Solubility	Soluble in Water
Supplier	Carlo Erba

* From Merck Index.

Table B – 13 Properties of Hydroxylamine-Hydrochloride *

Formula	NH ₂ OH*HCl
Chemical Name	Hydroxylamine-Hydrochloride
Physical Properties	
Molecular Weight	69.49
Status at 25 °C	Solid
Color	White
Boiling Point (°C)	58
Melting Point (°C)	33
Specific Gravity	1.20
Solubility	Soluble in Water
Purity	> 99%
Supplier	Carlo Erba

* From Merck Index.

Table B – 14 Properties of Sodium Chloride *

Formula	NaCl
Chemical Name	Sodium Chloride
Physical Properties	
Molecular Weight	58.54
Status at 25 °C	Solid
Color	White
Boiling Point (°C)	804
Melting Point (°C)	-
Specific Gravity	2.17
Solubility	Soluble in Water
Purity	> 99%
Supplier	Carlo Erba

* From Merck Index.

VITA



Mr.Vichit Thammawan was born on March 17, 1976 in Bangkok, Thailand. He received the Bachelor degree of Chemical Engineering from Faculty of Engineering, Mahidol University in April 1999. He continued his Master's study at Chulalongkorn University in June 1999.