REFERENCES

1. Linseele, V., Van Neer, W. and Hendrickx, S., 2008, "Early Cat Taming in Egypt: A Correction", **Journal of Archaeological Science**, Vol. 35, No. 9, pp. 2672-2673.

2. Linseele, V., Van Neer, W. and Hendrickx, S., 2007, "Evidence for Early Cat Taming in Egypt", **Journal of Archaeological Science**, Vol. 34, No. 12, pp. 2081-2090.

3. Heyes, J.A., "Evaluation the Performance of a Recycled Paper-Mineral Compositise as Cat Litter", **Crop and Food Research**.

4. Zentek, J. and Schulz, A., 2004, "Urinary Composition of Cats Is Affected by the Source of Dietary Protein ", **Journal of Nutrition**, Vol. 134, No., pp. 2162s-2165s.

5. Hojamberdiev, M., Kameshima, Y., Nakajima, A., Okada, K., and Kadirova, Z., 2008, "Preparation and Sorption Properties of Materials from Paper Sludge", **Journal of Hazardous Materials**, Vol. 151, No. 2-3, pp. 710-719.

6. Lips, S.J.J., Iniguez de Heredia, G.M., Op den Kamp, R.G.M. and van Dam, J.E.G., 2009, "Water Absorption Characteristics of Kenaf Core to Use as Animal Bedding Material", **Industrial Crops and Products**, Vol. 29, No. 1, pp. 73-79.

7. Vichaikosol, J., 2009, **The Study of the Cat-Litter from an Industrial by-Product Phosphogypsum**, Department of chemical engineering, King Mongkut's University of Technology Thonburi.

8. Been, K., 1979, **Process for Making a Synthetic Liquid Absorbent and Products Resulting Therefrom**, United States.

9. Valenta, R.C., 1981, **Process for Manufacturing Synthetic Gypsum Absorbent Granules**, United States.

10. Harrison, R.E., 1989, **Method of Making Animal Litter Having Improved Absorbent and Deodorizing Qualities**, United States.

11. Evans, D.F., Steele, Richard Binion , Sumner, Malcolm Edward 2000, **Animal Litter Comprising Gypsum and Aluminum Sulfate and Processes of Making Same**, United States.

12. Silva, T., 2005, **Method of Making Coconut Coir Pitch Cat Litter from Powder Created from Crushed Coconut Husks**, United States.

13. Macquoid, M., 2003, **Bio-Degradable Pet Litter Made from Coconut Coir**, United States.

14. Tayibi, H., Choura, M., Lœpez, F.A., Alguacil, F.J. and Lopez-Delgado, A., 2009, "Environmental Impact and Management of Phosphogypsum", **Journal of Environmental Management**, Vol. 90, No. 8, pp. 2377-2386.

15. Ullmann, F., 2002. **Ullmann's Encyclopedia of Industrial Chemistry**. John Wiley & Sons, Ltd.

16. Anon., **Kirk-Othmer Encyclopedia of Chemical Technology**, Vol. 2.

17. Rhodes, M., "Introduction to Particle Technology", In **Book Introduction to Particle Technology**. Editor, 2nd, John Wiley & Sons, Ltd, pp. 337-355

18. Litster, J. and Ennis, B., 2004, "The Science and Engineering of Granulation Processes", In **Book The Science and Engineering of Granulation Processes**. Editor, Kluwer Acedemic Publishers, pp. 179-195.

19. Igwe, G.J.I., 1991, "Powder Technology and Multiphase System", In **Book Powder Technology and Multiphase System**. Editor, Ellis Horwood Limited, pp. 206-209.

20. Rouquerol, J.R. and K.Sing, 1999, "Adsorption by Powders and Porous Solids", In **Book Adsorption by Powders and Porous Solids**. Editor, Academic Press, pp. 165-215.

21. Do, D.D., Do, H.D. and Nicholson, D., 2010, "A Computer Appraisal of Bet Theory, Bet Surface Area and the Calculation of Surface Excess for Gas Adsorption on a Graphite Surface", **Chemical Engineering Science**, Vol. 65, No. 10, pp. 3331-3340.

22. Stoneham, D., 2009, **Comparing Laser Diffraction and Bet Surface Area Measurements**, [online], Available: http://www.malvern.com/LabEng/technology/laser_diffraction/gas_adsorption_bet.htm

23. Ash, B., Satapathy, D., Mukherjee, P., Nanda, B., Gumaste, J. and Mishra, B., 2006, "Characterization and Application of Activated Carbon Prepared from Waste Coir Pith", **Journal of Scientific & Industrial Research**, Vol. 65, pp. 1008-1012.

24. Carlsson, L.A. and Lindstrom, T., 2005, "A Shear-Lag Approach to the Tensile Strength of Paper", **Composites Science and Technology**, Vol. 65, No. 2, pp. 183-189.

25. Zhang, H., Zhang, Z. and Friedrich, K., 2007, "Effect of Fiber Length on the Wear Resistance of Short Carbon Fiber Reinforced Epoxy Composites", **Composites Science and Technology**, Vol. 67, No. 2, pp. 222-230.

26. Callaghan, D.J., Vaziri, A. and Nayeb-Hashemi, H., 2006, "Effect of Fiber Volume Fraction and Length on the Wear Characteristics of Glass Fiber-Reinforced Dental Composites", **Dental Materials**, Vol. 22, No. 1, pp. 84-93.

APPENDIX A

Data Calculation

A.1 Calculation for Table 4.1

From linear fitting of water adsorption of plaster data, the adsorption capacity can be estimated by the equation

Adsorption capacity(%) = -128.77 x density (g/ml) +148.67

eg. density = 0.82 g/ml, Adsorption capacity = 128.77 x 0.82 +148.67 = 43.5 %

Adsorption capacity of paper pulp = 388.6 %

Adsorption capacity of coconut coir = 614.4 %

In the obtained cat-litter, there are 90% of plaster and 10% of paper pulp/coconut coir.

Adsorption capacity of the obtained cat-litter

= 0.9 x Adsorption capacity of plaster + 0.1 x Adsorption capacity of paper pulp/coconut coir

eg. density of the obtained cat-litter with added paper pulp = 0.82 g/ml,

Adsorption capacity of the obtained cat-litter = (0.9 x 43.5) + (0.1 x 388.6)
= 61.71 %

Table A.1 : Cost of materials

Materials	Cost (Baht)	Quantity (g)	Cost (Baht/kg)
Paper pulp	35	400	437.5
Coconut coir	10	80	25

APPENDIX B

The Experimental Data of Density Test

Table B.1: Experimental data of density test

	Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
A1	0.4142	0.8605	0.1159	0.1188	1.0243
	0.4125	0.8053	0.1076	0.1100	1.0224
	0.4096	0.8550	0.1127	0.1155	1.0255
	0.4500	0.8850	0.1408	0.1382	0.9816
	0.4425	0.7750	0.1192	0.1261	1.0582
	0.4400	0.9300	0.1414	0.1485	1.0503
	0.4400	0.9900	0.1505	0.1550	1.0299
	0.4500	0.9400	0.1495	0.1507	1.0080
	0.4500	0.8000	0.1272	0.1253	0.9845
	0.4475	0.8650	0.1360	0.1419	1.0432
	0.4550	0.8650	0.1406	0.1430	1.0164
	0.4500	0.9400	0.1495	0.1507	1.0083
	0.4475	0.8550	0.1345	0.1401	1.0417
	0.4450	0.9700	0.1509	0.1583	1.0492
	0.4625	0.8600	0.1445	0.1429	0.9893
	0.4475	0.8900	0.1400	0.1441	1.0291
	0.4500	0.9400	0.1495	0.1494	0.9990
	0.4400	0.8900	0.1353	0.1332	0.9846
	0.4500	0.8200	0.1304	0.1313	1.0068
	0.4550	0.8000	0.1301	0.1336	1.0271
	0.4500	0.8000	0.1272	0.1285	1.0099
	0.4500	0.7800	0.1241	0.1268	1.0221
	0.4500	0.7700	0.1225	0.1242	1.0142
	0.4450	0.7900	0.1229	0.1254	1.0206
	0.4450	0.8550	0.1330	0.1321	0.9934
	0.4400	0.8700	0.1323	0.1365	1.0319
	0.4400	0.7850	0.1194	0.1231	1.0313
	0.4400	0.7700	0.1171	0.1175	1.0036
	0.4500	0.8200	0.1304	0.1332	1.0214
	0.4475	0.7950	0.1250	0.1274	1.0189

Table B.1: Experimental data of density test (Continued)

Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
0.4425	0.8000	0.1230	0.1274	1.0355
0.4525	0.7700	0.1238	0.1225	0.9893
0.4400	0.8100	0.1232	0.1253	1.0174
0.4500	0.7900	0.1256	0.1275	1.0148
0.4400	0.7850	0.1194	0.1215	1.0179
0.4500	0.7800	0.1241	0.1264	1.0189
0.4400	0.7800	0.1186	0.1221	1.0295
0.4400	0.8750	0.1330	0.1354	1.0177
0.4425	0.7600	0.1169	0.1153	0.9865
0.4450	0.8000	0.1244	0.1274	1.0239
0.4525	0.7450	0.1198	0.1223	1.0208
0.4400	0.7650	0.1163	0.1175	1.0101
0.4525	0.7950	0.1278	0.1321	1.0333
0.4500	0.7800	0.1241	0.1284	1.0350
0.4500	0.7900	0.1256	0.1249	0.9941
0.4400	0.8050	0.1224	0.1253	1.0237
0.4425	0.7800	0.1200	0.1185	0.9879
0.4400	0.7550	0.1148	0.1193	1.0392
0.4400	0.8100	0.1232	0.1253	1.0174
0.4450	0.8450	0.1314	0.1323	1.0067
0.4450	0.7600	0.1182	0.1225	1.0364
0.4475	0.7800	0.1227	0.1253	1.0214
0.4475	0.7550	0.1187	0.1229	1.0350
0.4350	0.8450	0.1256	0.1274	1.0145
0.4400	0.7650	0.1163	0.1201	1.0325
0.4300	0.7700	0.1118	0.1143	1.0222
0.4450	0.7800	0.1213	0.1232	1.0156
0.4400	0.8000	0.1216	0.1232	1.0128
0.4400	0.7500	0.1140	0.1132	0.9926
0.4350	0.8400	0.1248	0.1246	0.9978

Table B.1: Experimental data of density test (Continued)

Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
0.4450	0.8500	0.1322	0.1324	1.0015
0.4400	0.7550	0.1148	0.1183	1.0305
0.4550	0.7850	0.1276	0.1281	1.0036
0.4350	0.8250	0.1226	0.1243	1.0138
0.4475	0.7750	0.1219	0.1253	1.0280
0.4450	0.8250	0.1283	0.1273	0.9921
0.4400	0.8700	0.1323	0.1367	1.0334
0.4400	0.7800	0.1186	0.1211	1.0211
0.4400	0.7700	0.1171	0.1221	1.0429
0.4425	0.8300	0.1276	0.1285	1.0067
0.4475	0.8350	0.1313	0.1328	1.0112
0.4425	0.8550	0.1315	0.1295	0.9849
0.4400	0.8400	0.1277	0.1295	1.0139
0.4425	0.8100	0.1246	0.1274	1.0227
0.4450	0.7750	0.1205	0.1184	0.9823
0.4450	0.8350	0.1299	0.1312	1.0103
0.4425	0.8250	0.1269	0.1258	0.9915
0.4450	0.9000	0.1400	0.1385	0.9895
0.4400	0.7400	0.1125	0.1135	1.0087
0.4400	0.7850	0.1194	0.1184	0.9919
0.4500	0.8850	0.1408	0.1435	1.0195
0.4425	0.8800	0.1353	0.1453	1.0737
0.4450	0.9200	0.1431	0.1395	0.9749
0.4425	0.8450	0.1299	0.1394	1.0727
0.4475	0.7750	0.1219	0.1274	1.0452
0.4450	0.8600	0.1338	0.1385	1.0355
0.4425	0.7800	0.1200	0.1194	0.9954
0.4475	0.9050	0.1423	0.1395	0.9801
0.4525	0.7450	0.1198	0.1285	1.0726
0.4350	0.8850	0.1315	0.1335	1.0150

Table B.1: Experimental data of density test (Continued)

	Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
	0.4350	0.7050	0.1048	0.1052	1.0041
	0.4425	0.8050	0.1238	0.1294	1.0453
	0.4300	0.7550	0.1096	0.1103	1.0060
	0.4400	0.7250	0.1102	0.1294	1.1738
	0.4450	0.9450	0.1470	0.1384	0.9417
	0.4400	0.9750	0.1483	0.1495	1.0084
	0.4450	0.7350	0.1143	0.1122	0.9815
	0.4400	0.8500	0.1292	0.1303	1.0082
	0.4500	0.8200	0.1304	0.1354	1.0385
	0.4450	0.7800	0.1213	0.1241	1.0227
A2	0.4400	0.9683	0.1472	0.1414	0.9605
	0.4300	0.9017	0.1309	0.1291	0.9856
	0.4233	0.9550	0.1344	0.1286	0.9567
	0.4400	0.9467	0.1439	0.1337	0.9287
	0.4100	0.9200	0.1215	0.1177	0.9693
	0.4260	0.8147	0.1161	0.1120	0.9642
	0.4100	0.9260	0.1223	0.1153	0.9431
	0.4300	1.0500	0.1525	0.1457	0.9553
	0.4250	0.9100	0.1291	0.1236	0.9577
	0.4200	0.8650	0.1198	0.1158	0.9660
	0.4300	0.8000	0.1162	0.1070	0.9208
	0.4250	1.0400	0.1475	0.1368	0.9272
	0.4200	0.7900	0.1094	0.1025	0.9362
	0.4450	0.9900	0.1540	0.1445	0.9383
	0.4200	0.9200	0.1275	0.1237	0.9705
	0.4200	0.8300	0.1150	0.1109	0.9642
	0.4250	0.8000	0.1135	0.1096	0.9654
	0.4250	0.7750	0.1099	0.1007	0.9156
	0.4300	0.8300	0.1205	0.1124	0.9329
	0.4300	0.7450	0.1082	0.1080	0.9984

Table B.1: Experimental data of density test (Continued)

Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
0.4200	0.8300	0.1150	0.1086	0.9442
0.4200	0.8450	0.1171	0.1085	0.9272
0.4300	0.7150	0.1038	0.1004	0.9670
0.4200	0.8300	0.1150	0.1154	1.0031
0.4300	0.8000	0.1162	0.1096	0.9438
0.4200	0.8500	0.1178	0.1111	0.9436
0.4250	0.7700	0.1092	0.1065	0.9749
0.4300	0.8250	0.1198	0.1139	0.9510
0.4250	0.8450	0.1199	0.1160	0.9680
0.4250	0.8200	0.1163	0.1164	1.0007
0.4300	0.8100	0.1176	0.1120	0.9524
0.4400	0.8100	0.1232	0.1223	0.9932
0.4300	0.8250	0.1198	0.1124	0.9380
0.4400	0.7800	0.1186	0.1186	1.0003
0.4250	0.7350	0.1043	0.0991	0.9508
0.4300	0.7200	0.1046	0.1038	0.9924
0.4300	0.8000	0.1162	0.1061	0.9135
0.4250	0.7400	0.1050	0.0991	0.9444
0.4200	0.8200	0.1136	0.1144	1.0068
0.4300	0.7500	0.1089	0.1034	0.9496
0.4400	0.8200	0.1247	0.1182	0.9477
0.4300	0.7550	0.1096	0.1050	0.9573
0.4250	0.7800	0.1107	0.1081	0.9767
0.4300	0.8250	0.1198	0.1195	0.9972
0.4200	0.8000	0.1108	0.1069	0.9646
0.4200	0.7800	0.1081	0.1062	0.9829
0.4200	0.7850	0.1088	0.1077	0.9899
0.4300	0.8300	0.1205	0.1103	0.9154
0.4350	0.7500	0.1115	0.1105	0.9912
0.4400	0.8000	0.1216	0.1166	0.9588

Table B.1: Experimental data of density test (Continued)

Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
0.4400	0.8350	0.1270	0.1237	0.9741
0.4200	0.8500	0.1178	0.1147	0.9739
0.4200	0.7750	0.1074	0.1032	0.9611
0.4200	0.8350	0.1157	0.1078	0.9322
0.4200	0.7600	0.1053	0.0971	0.9225
0.4250	0.7500	0.1064	0.0994	0.9347
0.4200	0.7650	0.1060	0.0986	0.9304
0.4300	0.8200	0.1191	0.1149	0.9651
0.4300	0.7800	0.1133	0.1082	0.9548
0.4250	0.7350	0.1043	0.1019	0.9775
0.4250	0.7700	0.1092	0.1054	0.9650
0.4300	0.7850	0.1140	0.1048	0.9197
0.4300	0.7700	0.1118	0.1082	0.9677
0.4300	0.7500	0.1089	0.1051	0.9647
0.4300	0.8000	0.1162	0.1144	0.9845
0.4200	0.8100	0.1122	0.1034	0.9217
0.4200	0.7700	0.1067	0.1044	0.9788
0.4400	0.7550	0.1148	0.1099	0.9574
0.4250	0.8350	0.1185	0.1150	0.9706
0.4300	0.7500	0.1089	0.1061	0.9738
0.4300	0.7650	0.1111	0.1084	0.9759
0.4300	0.7800	0.1133	0.1061	0.9369
0.4250	0.7650	0.1085	0.1035	0.9537
0.4250	0.8200	0.1163	0.1126	0.9676
0.4200	0.7600	0.1053	0.1040	0.9873
0.4300	0.8100	0.1176	0.1129	0.9602
0.4350	0.8000	0.1189	0.1088	0.9148
0.4200	0.7450	0.1032	0.0956	0.9258
0.4300	0.7800	0.1133	0.1082	0.9556
0.4200	0.8400	0.1164	0.1132	0.9724

Table B.1: Experimental data of density test (Continued)

	Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
	0.4300	0.7800	0.1133	0.1099	0.9698
	0.4200	0.7900	0.1094	0.1012	0.9250
	0.4200	0.7250	0.1004	0.0948	0.9435
	0.4250	0.7700	0.1092	0.1027	0.9398
	0.4250	0.8100	0.1149	0.1069	0.9303
	0.4300	0.7900	0.1147	0.1074	0.9362
	0.4300	0.8200	0.1191	0.1133	0.9513
	0.4300	0.7450	0.1082	0.1042	0.9633
	0.4250	0.8100	0.1149	0.1098	0.9556
	0.4300	0.8050	0.1169	0.1127	0.9640
	0.4250	0.8150	0.1156	0.1069	0.9247
	0.4300	0.8300	0.1205	0.1101	0.9138
	0.4300	0.7950	0.1154	0.1137	0.9848
	0.4300	0.8000	0.1162	0.1113	0.9580
	0.4350	0.7450	0.1107	0.1038	0.9375
	0.4300	0.7900	0.1147	0.1134	0.9884
	0.4250	0.7550	0.1071	0.1014	0.9469
	0.4300	0.9400	0.1365	0.1301	0.9528
	0.4400	0.8100	0.1232	0.1232	1.0005
	0.4350	0.7850	0.1167	0.1129	0.9674
A3	0.4167	0.8417	0.1148	0.1008	0.8786
	0.4411	0.8103	0.1238	0.1171	0.9459
	0.4327	0.8544	0.1256	0.1186	0.9439
	0.4183	0.8079	0.1110	0.1043	0.9392
	0.4250	0.8050	0.1142	0.1106	0.9685
	0.4150	0.8000	0.1082	0.1016	0.9393
	0.4300	0.8500	0.1234	0.1207	0.9779
	0.4200	0.8500	0.1178	0.1073	0.9107
	0.4200	0.8350	0.1157	0.1035	0.8942
	0.4300	0.9000	0.1307	0.1247	0.9537
	0.4300	0.8950	0.1300	0.1224	0.9415

Table B.1: Experimental data of density test (Continued)

Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
0.4325	0.8600	0.1263	0.1169	0.9252
0.4225	0.8000	0.1122	0.1099	0.9799
0.4300	0.8250	0.1198	0.1131	0.9439
0.4325	0.8300	0.1219	0.1126	0.9235
0.4300	0.9000	0.1307	0.1249	0.9556
0.4300	0.8650	0.1256	0.1196	0.9518
0.4225	0.8000	0.1122	0.1054	0.9397
0.4250	0.8150	0.1156	0.1117	0.9665
0.4300	0.8400	0.1220	0.1138	0.9328
0.4250	0.7300	0.1036	0.0974	0.9407
0.4250	0.7300	0.1036	0.0938	0.9057
0.4200	0.8550	0.1185	0.1088	0.9182
0.4300	0.8050	0.1169	0.1138	0.9731
0.4300	0.8600	0.1249	0.1178	0.9428
0.4150	0.7900	0.1069	0.0997	0.9334
0.4250	0.7900	0.1121	0.1093	0.9757
0.4250	0.8000	0.1135	0.1021	0.8995
0.4300	0.8150	0.1184	0.1167	0.9858
0.4300	0.7750	0.1125	0.1057	0.9394
0.4300	0.8000	0.1162	0.1106	0.9522
0.4300	0.8450	0.1227	0.1158	0.9433
0.4150	0.8000	0.1082	0.0999	0.9229
0.4150	0.7450	0.1008	0.0918	0.9111
0.4300	0.8400	0.1220	0.1165	0.9548
0.4150	0.7800	0.1055	0.0980	0.9288
0.4200	0.8100	0.1122	0.1017	0.9062
0.4150	0.8500	0.1150	0.1140	0.9911
0.4250	0.8400	0.1192	0.1097	0.9209
0.4250	0.7300	0.1036	0.0931	0.8992
0.4150	0.7900	0.1069	0.0974	0.9118

Table B.1: Experimental data of density test (Continued)

Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
0.4200	0.7250	0.1004	0.0938	0.9342
0.4150	0.7500	0.1014	0.0965	0.9509
0.4250	0.7950	0.1128	0.1066	0.9454
0.4250	0.7750	0.1099	0.1023	0.9303
0.4250	0.8450	0.1199	0.1171	0.9766
0.4200	0.7350	0.1018	0.0959	0.9422
0.4250	0.7500	0.1064	0.1006	0.9454
0.4150	0.7600	0.1028	0.0957	0.9305
0.4250	0.8350	0.1185	0.1166	0.9843
0.4150	0.8400	0.1136	0.1023	0.9002
0.4150	0.8000	0.1082	0.0989	0.9138
0.4300	0.7650	0.1111	0.1008	0.9071
0.4300	0.8500	0.1234	0.1226	0.9929
0.4300	0.8650	0.1256	0.1177	0.9372
0.4150	0.7700	0.1042	0.0936	0.8988
0.4250	0.8250	0.1170	0.1074	0.9176
0.4300	0.8050	0.1169	0.1076	0.9203
0.4250	0.7750	0.1099	0.1077	0.9797
0.4200	0.8150	0.1129	0.1092	0.9673
0.4150	0.8200	0.1109	0.0994	0.8964
0.4250	0.8200	0.1163	0.1111	0.9548
0.4150	0.7800	0.1055	0.1032	0.9779
0.4250	0.8400	0.1192	0.1171	0.9831
0.4300	0.7550	0.1096	0.0986	0.8990
0.4250	0.7950	0.1128	0.1062	0.9418
0.4200	0.7550	0.1046	0.1018	0.9735
0.4200	0.7600	0.1053	0.0943	0.8958
0.4200	0.8150	0.1129	0.1113	0.9859
0.4300	0.8100	0.1176	0.1116	0.9491
0.4250	0.8400	0.1192	0.1091	0.9157

Table B.1: Experimental data of density test (Continued)

Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
0.4250	0.8450	0.1199	0.1113	0.9289
0.4150	0.7750	0.1048	0.0975	0.9301
0.4250	0.7850	0.1114	0.1043	0.9364
0.4200	0.7900	0.1094	0.1051	0.9606
0.4150	0.7950	0.1075	0.0977	0.9087
0.4250	0.8050	0.1142	0.1120	0.9809
0.4200	0.8050	0.1115	0.1010	0.9056
0.4200	0.7650	0.1060	0.1052	0.9928
0.4250	0.7900	0.1121	0.1020	0.9098
0.4150	0.7500	0.1014	0.0944	0.9303
0.4200	0.7550	0.1046	0.0954	0.9124
0.4200	0.7850	0.1088	0.1006	0.9253
0.4300	0.8200	0.1191	0.1102	0.9251
0.4300	0.8250	0.1198	0.1104	0.9218
0.4250	0.8050	0.1142	0.1055	0.9240
0.4150	0.7750	0.1048	0.0996	0.9498
0.4150	0.7550	0.1021	0.1014	0.9927
0.4250	0.8500	0.1206	0.1164	0.9650
0.4250	0.7600	0.1078	0.1030	0.9557
0.4250	0.8200	0.1163	0.1103	0.9485
0.4250	0.7950	0.1128	0.1078	0.9560
0.4250	0.8200	0.1163	0.1121	0.9634
0.4250	0.8050	0.1142	0.1095	0.9588
0.4300	0.8000	0.1162	0.1081	0.9301
0.4250	0.7700	0.1092	0.0982	0.8994
0.4250	0.7800	0.1107	0.0993	0.8975
0.4250	0.8100	0.1149	0.1115	0.9703
0.4250	0.7850	0.1114	0.0996	0.8942
0.4200	0.8300	0.1150	0.1075	0.9350
0.4300	0.7800	0.1133	0.1056	0.9325

Table B.1: Experimental data of density test (Continued)

	Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
A4	0.4167	0.8250	0.1125	0.1019	0.9059
	0.4300	0.9450	0.1372	0.1233	0.8985
	0.4050	0.9133	0.1177	0.1051	0.8928
	0.4200	0.7500	0.1039	0.0895	0.8616
	0.4200	0.8350	0.1157	0.1050	0.9076
	0.4100	0.8500	0.1122	0.0957	0.8524
	0.4000	0.8200	0.1030	0.0955	0.9270
	0.4200	0.9450	0.1309	0.1157	0.8836
	0.4175	0.8000	0.1095	0.0970	0.8852
	0.4050	1.0500	0.1353	0.1221	0.9030
	0.4200	0.8050	0.1115	0.1027	0.9207
	0.4000	0.9000	0.1131	0.0995	0.8798
	0.4150	0.8600	0.1163	0.1024	0.8804
	0.3950	0.7200	0.0882	0.0791	0.8960
	0.4100	0.8450	0.1116	0.0952	0.8530
	0.4100	0.8350	0.1102	0.0970	0.8796
	0.4150	0.9500	0.1285	0.1167	0.9084
	0.4100	0.7200	0.0951	0.0853	0.8978
	0.4100	0.7300	0.0964	0.0865	0.8972
	0.4250	0.7900	0.1121	0.0961	0.8577
	0.4150	0.7450	0.1008	0.0869	0.8625
	0.4150	0.8100	0.1096	0.0973	0.8880
	0.4150	0.7700	0.1042	0.0931	0.8942
	0.4100	0.7300	0.0964	0.0880	0.9128
	0.4200	0.7400	0.1025	0.0966	0.9421
	0.4100	0.7650	0.1010	0.0874	0.8649
	0.4050	0.7650	0.0986	0.0852	0.8641
	0.4100	0.7800	0.1030	0.0967	0.9394
	0.4250	0.7500	0.1064	0.0948	0.8912
	0.4050	0.7550	0.0973	0.0858	0.8821

Table B.1: Experimental data of density test (Continued)

Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
0.4050	0.8250	0.1063	0.0967	0.9103
0.4200	0.8450	0.1171	0.1004	0.8580
0.4200	0.8200	0.1136	0.0972	0.8553
0.4200	0.7950	0.1101	0.1018	0.9241
0.4100	0.7450	0.0984	0.0855	0.8690
0.4100	0.7500	0.0990	0.0912	0.9205
0.4250	0.8600	0.1220	0.1050	0.8606
0.4200	0.8150	0.1129	0.0993	0.8793
0.4050	0.7400	0.0953	0.0833	0.8737
0.4100	0.8200	0.1083	0.1000	0.9240
0.4100	0.8550	0.1129	0.0984	0.8716
0.4100	0.7650	0.1010	0.0864	0.8553
0.4150	0.7800	0.1055	0.0941	0.8920
0.4050	0.8000	0.1031	0.0909	0.8816
0.4250	0.8100	0.1149	0.1042	0.9068
0.4100	0.8400	0.1109	0.0972	0.8764
0.4200	0.7550	0.1046	0.0951	0.9095
0.4200	0.7900	0.1094	0.0979	0.8943
0.4250	0.8200	0.1163	0.1064	0.9148
0.4250	0.7400	0.1050	0.0903	0.8604
0.4250	0.7800	0.1107	0.1025	0.9262
0.4100	0.7850	0.1036	0.0914	0.8816
0.4200	0.7750	0.1074	0.0980	0.9124
0.4100	0.8300	0.1096	0.0980	0.8942
0.4100	0.7900	0.1043	0.0953	0.9140
0.4150	0.7800	0.1055	0.0909	0.8619
0.4150	0.7750	0.1048	0.0911	0.8686
0.4050	0.7550	0.0973	0.0912	0.9382
0.4250	0.8600	0.1220	0.1141	0.9350
0.4100	0.7550	0.0997	0.0905	0.9080

Table B.1: Experimental data of density test (Continued)

Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
0.4150	0.8200	0.1109	0.0984	0.8869
0.4100	0.8100	0.1069	0.0972	0.9091
0.4100	0.8050	0.1063	0.0934	0.8789
0.4050	0.8000	0.1031	0.0952	0.9241
0.4150	0.7900	0.1069	0.0906	0.8479
0.4150	0.8100	0.1096	0.0923	0.8429
0.4150	0.8000	0.1082	0.0983	0.9088
0.4100	0.7700	0.1017	0.0861	0.8465
0.4100	0.8300	0.1096	0.1008	0.9196
0.4100	0.7900	0.1043	0.0975	0.9346
0.4150	0.8000	0.1082	0.0974	0.9001
0.4100	0.8250	0.1089	0.0990	0.9092
0.4050	0.8250	0.1063	0.0958	0.9019
0.4250	0.8300	0.1177	0.1100	0.9343
0.4150	0.7400	0.1001	0.0935	0.9340
0.4050	0.7650	0.0986	0.0922	0.9355
0.4050	0.8100	0.1043	0.0903	0.8654
0.4150	0.8150	0.1102	0.0995	0.9028
0.4250	0.7700	0.1092	0.0979	0.8961
0.4150	0.7800	0.1055	0.0932	0.8834
0.4200	0.8000	0.1108	0.1004	0.9059
0.4050	0.7800	0.1005	0.0937	0.9327
0.4150	0.7850	0.1062	0.0927	0.8732
0.4100	0.7750	0.1023	0.0868	0.8482
0.4050	0.7800	0.1005	0.0943	0.9385
0.4200	0.7900	0.1094	0.1023	0.9343
0.4150	0.8000	0.1082	0.0996	0.9201
0.4050	0.7350	0.0947	0.0833	0.8802
0.4000	0.8200	0.1030	0.0903	0.8767
0.4100	0.8650	0.1142	0.0993	0.8694

Table B.1: Experimental data of density test (Continued)

	Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
	0.4100	0.8200	0.1083	0.1012	0.9350
	0.4000	0.7700	0.0968	0.0847	0.8754
	0.4150	0.7500	0.1014	0.0861	0.8487
	0.4050	0.8300	0.1069	0.0965	0.9025
	0.4000	0.7500	0.0942	0.0871	0.9242
	0.4050	0.7950	0.1024	0.0942	0.9194
	0.4150	0.8350	0.1129	0.1019	0.9022
	0.4150	0.9000	0.1217	0.1078	0.8857
	0.4150	0.8400	0.1136	0.1032	0.9083
	0.4200	0.8100	0.1122	0.1013	0.9026
A5	0.3856	0.7922	0.0925	0.0754	0.8145
	0.4000	0.8157	0.1025	0.0843	0.8222
	0.3846	0.8283	0.0962	0.0791	0.8220
	0.4500	0.8500	0.1352	0.1149	0.8497
	0.4275	0.8600	0.1234	0.0999	0.8094
	0.4100	0.8900	0.1175	0.0932	0.7929
	0.4100	0.8600	0.1135	0.0925	0.8144
	0.4250	0.8450	0.1199	0.0995	0.8296
	0.4250	0.8000	0.1135	0.0957	0.8434
	0.4200	0.7850	0.1088	0.0903	0.8302
	0.4200	0.8500	0.1178	0.0979	0.8317
	0.4200	0.8300	0.1150	0.0936	0.8136
	0.4150	0.8800	0.1190	0.1005	0.8445
	0.4300	0.7600	0.1104	0.0916	0.8299
	0.4000	0.8200	0.1030	0.0819	0.7943
	0.4075	0.7850	0.1024	0.0799	0.7806
	0.3950	0.8150	0.0999	0.0800	0.8011
	0.4100	0.8300	0.1096	0.0862	0.7866
	0.4150	0.7500	0.1014	0.0778	0.7671
	0.4250	0.7650	0.1085	0.0883	0.8141

Table B.1: Experimental data of density test (Continued)

Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
0.4250	0.7450	0.1057	0.0868	0.8215
0.4050	0.8400	0.1082	0.0917	0.8472
0.4150	0.8000	0.1082	0.0917	0.8475
0.4100	0.7800	0.1030	0.0808	0.7851
0.4200	0.8400	0.1164	0.0941	0.8083
0.4050	0.8050	0.1037	0.0838	0.8078
0.4150	0.8200	0.1109	0.0851	0.7677
0.4150	0.7600	0.1028	0.0833	0.8102
0.4050	0.8300	0.1069	0.0853	0.7982
0.4250	0.8500	0.1206	0.0997	0.8264
0.4200	0.7600	0.1053	0.0816	0.7754
0.4100	0.8350	0.1102	0.0951	0.8624
0.4150	0.7650	0.1035	0.0876	0.8466
0.4200	0.8050	0.1115	0.0915	0.8205
0.4150	0.8450	0.1143	0.0949	0.8306
0.4250	0.7900	0.1121	0.0900	0.8029
0.4100	0.7550	0.0997	0.0858	0.8610
0.4150	0.7800	0.1055	0.0859	0.8146
0.4050	0.8050	0.1037	0.0815	0.7860
0.4150	0.8200	0.1109	0.0944	0.8508
0.4150	0.8150	0.1102	0.0896	0.8128
0.4150	0.8100	0.1096	0.0913	0.8330
0.4200	0.8250	0.1143	0.0957	0.8377
0.4100	0.7750	0.1023	0.0885	0.8647
0.4250	0.7950	0.1128	0.0964	0.8548
0.4200	0.8450	0.1171	0.0911	0.7783
0.4200	0.7900	0.1094	0.0849	0.7756
0.4150	0.7700	0.1042	0.0818	0.7854
0.4150	0.8200	0.1109	0.0894	0.8058
0.4100	0.8250	0.1089	0.0890	0.8169

Table B.1: Experimental data of density test (Continued)

Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
0.4250	0.7850	0.1114	0.0958	0.8604
0.4100	0.7950	0.1050	0.0825	0.7863
0.4250	0.8300	0.1177	0.1012	0.8595
0.4050	0.8250	0.1063	0.0892	0.8390
0.4150	0.7700	0.1042	0.0815	0.7828
0.4050	0.7650	0.0986	0.0777	0.7880
0.4100	0.7550	0.0997	0.0785	0.7872
0.4150	0.7400	0.1001	0.0859	0.8583
0.4150	0.7600	0.1028	0.0820	0.7975
0.4100	0.7450	0.0984	0.0812	0.8255
0.4250	0.7850	0.1114	0.0876	0.7862
0.4200	0.8200	0.1136	0.0929	0.8175
0.4050	0.8000	0.1031	0.0845	0.8202
0.4150	0.8100	0.1096	0.0867	0.7910
0.4150	0.8150	0.1102	0.0845	0.7665
0.4150	0.7900	0.1069	0.0890	0.8332
0.4150	0.7600	0.1028	0.0874	0.8503
0.4150	0.8000	0.1082	0.0916	0.8467
0.4150	0.8200	0.1109	0.0851	0.7676
0.4200	0.7950	0.1101	0.0880	0.7987
0.4150	0.8250	0.1116	0.0957	0.8579
0.4100	0.8200	0.1083	0.0883	0.8154
0.4200	0.8150	0.1129	0.0882	0.7811
0.4150	0.7750	0.1048	0.0857	0.8178
0.4050	0.8150	0.1050	0.0905	0.8622
0.4100	0.7950	0.1050	0.0838	0.7985
0.4250	0.7700	0.1092	0.0936	0.8568
0.4050	0.8150	0.1050	0.0807	0.7686
0.4150	0.8200	0.1109	0.0938	0.8455
0.4100	0.7400	0.0977	0.0837	0.8570

Table B.1: Experimental data of density test (Continued)

	Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
	0.4200	0.7650	0.1060	0.0906	0.8545
	0.4150	0.7800	0.1055	0.0898	0.8511
	0.4250	0.8400	0.1192	0.0936	0.7851
	0.4200	0.7650	0.1060	0.0896	0.8454
	0.4050	0.7700	0.0992	0.0768	0.7740
	0.4050	0.7800	0.1005	0.0809	0.8051
	0.4150	0.8300	0.1123	0.0933	0.8314
	0.4150	0.8100	0.1096	0.0909	0.8293
	0.4150	0.8150	0.1102	0.0929	0.8427
	0.4150	0.8200	0.1109	0.0938	0.8456
	0.4250	0.7750	0.1099	0.0902	0.8203
	0.4100	0.7800	0.1030	0.0853	0.8279
	0.4150	0.8000	0.1082	0.0834	0.7708
	0.4150	0.7850	0.1062	0.0856	0.8063
	0.4100	0.8300	0.1096	0.0843	0.7689
	0.4100	0.8100	0.1069	0.0912	0.8530
	0.4200	0.7500	0.1039	0.0799	0.7685
	0.4100	0.7750	0.1023	0.0855	0.8354
	0.4000	0.9100	0.1144	0.0925	0.8086
	0.4100	0.8050	0.1063	0.0852	0.8014
B1	0.4583	0.8300	0.1369	0.1222	0.8925
	0.4400	0.7683	0.1168	0.1048	0.8969
	0.4467	0.7900	0.1238	0.1147	0.9266
	0.4650	0.6600	0.1121	0.1047	0.9341
	0.4500	0.6650	0.1058	0.0980	0.9270
	0.4625	0.6950	0.1168	0.1065	0.9121
	0.4525	0.7000	0.1126	0.1042	0.9254
	0.4600	0.7000	0.1163	0.1061	0.9120
	0.4600	0.7000	0.1163	0.1066	0.9163
	0.4650	0.7350	0.1248	0.1176	0.9422

Table B.1: Experimental data of density test (Continued)

Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
0.4600	0.7450	0.1238	0.1177	0.9506
0.4725	0.7850	0.1376	0.1207	0.8769
0.4575	0.6850	0.1126	0.1040	0.9236
0.4600	0.7600	0.1263	0.1151	0.9115
0.4500	0.7650	0.1217	0.1115	0.9164
0.4575	0.6400	0.1052	0.1018	0.9675
0.4550	0.6600	0.1073	0.0957	0.8918
0.4500	0.8000	0.1272	0.1195	0.9394
0.4600	0.7650	0.1271	0.1178	0.9265
0.4550	0.8050	0.1309	0.1161	0.8868
0.4500	0.7500	0.1193	0.1098	0.9203
0.4600	0.7800	0.1296	0.1173	0.9049
0.4600	0.8000	0.1330	0.1161	0.8736
0.4650	0.8100	0.1376	0.1226	0.8911
0.4500	0.7900	0.1256	0.1123	0.8936
0.4550	0.8200	0.1333	0.1212	0.9088
0.4500	0.8050	0.1280	0.1186	0.9262
0.4550	0.8000	0.1301	0.1198	0.9210
0.4650	0.7700	0.1308	0.1163	0.8897
0.4600	0.7750	0.1288	0.1191	0.9251
0.4650	0.8000	0.1359	0.1288	0.9478
0.4650	0.7800	0.1325	0.1223	0.9232
0.4600	0.8100	0.1346	0.1228	0.9120
0.4500	0.7900	0.1256	0.1121	0.8925
0.4600	0.7650	0.1271	0.1181	0.9288
0.4550	0.7750	0.1260	0.1082	0.8590
0.4550	0.7800	0.1268	0.1192	0.9399
0.4500	0.7950	0.1264	0.1166	0.9220
0.4500	0.7700	0.1225	0.1096	0.8954
0.4500	0.7650	0.1217	0.1166	0.9585

Table B.1: Experimental data of density test (Continued)

Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
0.4650	0.8000	0.1359	0.1244	0.9157
0.4650	0.8100	0.1376	0.1282	0.9321
0.4600	0.7800	0.1296	0.1213	0.9355
0.4550	0.8250	0.1341	0.1193	0.8893
0.4450	0.7800	0.1213	0.1115	0.9195
0.4500	0.8150	0.1296	0.1176	0.9073
0.4550	0.8100	0.1317	0.1163	0.8834
0.4600	0.7900	0.1313	0.1178	0.8976
0.4450	0.8200	0.1275	0.1197	0.9385
0.4500	0.8000	0.1272	0.1106	0.8696
0.4650	0.7850	0.1333	0.1243	0.9324
0.4600	0.7950	0.1321	0.1210	0.9161
0.4550	0.8500	0.1382	0.1259	0.9110
0.4600	0.8100	0.1346	0.1207	0.8967
0.4500	0.8250	0.1312	0.1172	0.8931
0.4450	0.7750	0.1205	0.1063	0.8823
0.4600	0.7800	0.1296	0.1141	0.8805
0.4550	0.7850	0.1276	0.1158	0.9074
0.4600	0.7850	0.1305	0.1190	0.9118
0.4500	0.8300	0.1320	0.1254	0.9501
0.4550	0.8300	0.1350	0.1286	0.9529
0.4550	0.8200	0.1333	0.1157	0.8680
0.4550	0.7850	0.1276	0.1104	0.8652
0.4600	0.8000	0.1330	0.1267	0.9528
0.4650	0.8250	0.1401	0.1282	0.9150
0.4550	0.8150	0.1325	0.1205	0.9094
0.4500	0.7700	0.1225	0.1166	0.9520
0.4650	0.7700	0.1308	0.1138	0.8704
0.4550	0.8000	0.1301	0.1151	0.8850
0.4600	0.7900	0.1313	0.1139	0.8674

Table B.1: Experimental data of density test (Continued)

Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
0.4600	0.8400	0.1396	0.1257	0.9003
0.4550	0.7900	0.1285	0.1114	0.8673
0.4550	0.7500	0.1219	0.1058	0.8672
0.4600	0.8200	0.1363	0.1275	0.9358
0.4650	0.8150	0.1384	0.1307	0.9444
0.4650	0.7600	0.1291	0.1155	0.8948
0.4500	0.8100	0.1288	0.1227	0.9528
0.4500	0.8050	0.1280	0.1205	0.9416
0.4600	0.7900	0.1313	0.1141	0.8691
0.4450	0.7800	0.1213	0.1107	0.9128
0.4600	0.8100	0.1346	0.1242	0.9229
0.4600	0.7700	0.1280	0.1225	0.9577
0.4550	0.8400	0.1366	0.1221	0.8937
0.4600	0.7900	0.1313	0.1201	0.9147
0.4600	0.7750	0.1288	0.1173	0.9104
0.4450	0.8100	0.1260	0.1174	0.9318
0.4600	0.8000	0.1330	0.1160	0.8727
0.4600	0.8000	0.1330	0.1170	0.8798
0.4450	0.7650	0.1190	0.1093	0.9186
0.4600	0.7900	0.1313	0.1160	0.8836
0.4500	0.7800	0.1241	0.1157	0.9329
0.4500	0.7800	0.1241	0.1127	0.9085
0.4600	0.8500	0.1413	0.1282	0.9078
0.4550	0.7800	0.1268	0.1144	0.9020
0.4650	0.8000	0.1359	0.1189	0.8751
0.4600	0.8000	0.1330	0.1192	0.8965
0.4550	0.7850	0.1276	0.1170	0.9167
0.4500	0.7700	0.1225	0.1111	0.9075
0.4575	0.7550	0.1241	0.1143	0.9212
0.4617	0.7883	0.1320	0.1185	0.8977

Table B.1: Experimental data of density test (Continued)

	Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
B2	0.4507	0.8600	0.1372	0.1165	0.8492
	0.4400	0.9420	0.1432	0.1220	0.8520
	0.4547	0.8160	0.1325	0.1128	0.8514
	0.4500	0.7450	0.1185	0.0982	0.8288
	0.4500	0.7300	0.1161	0.0985	0.8484
	0.4500	0.8300	0.1320	0.1160	0.8789
	0.4550	0.7550	0.1228	0.0987	0.8040
	0.4550	0.8750	0.1423	0.1206	0.8477
	0.4500	0.7400	0.1177	0.0963	0.8185
	0.4525	0.8000	0.1287	0.1094	0.8505
	0.4650	0.8650	0.1469	0.1161	0.7904
	0.4550	0.8950	0.1455	0.1242	0.8534
	0.4600	0.8000	0.1330	0.1069	0.8039
	0.4650	0.7500	0.1274	0.0994	0.7800
	0.4550	1.0400	0.1691	0.1432	0.8471
	0.4525	0.9950	0.1600	0.1369	0.8558
	0.4550	0.8200	0.1333	0.1085	0.8136
	0.4525	0.7250	0.1166	0.0989	0.8484
	0.4500	0.7800	0.1241	0.0987	0.7958
	0.4500	0.8000	0.1272	0.1067	0.8387
	0.4550	0.8200	0.1333	0.1115	0.8365
	0.4600	0.7900	0.1313	0.1067	0.8129
	0.4650	0.8000	0.1359	0.1090	0.8026
	0.4600	0.8100	0.1346	0.1116	0.8288
	0.4550	0.8150	0.1325	0.1073	0.8099
	0.4600	0.7850	0.1305	0.1113	0.8532
	0.4600	0.7900	0.1313	0.1137	0.8661
	0.4550	0.8100	0.1317	0.1074	0.8152
	0.4550	0.8150	0.1325	0.1096	0.8272
	0.4550	0.8050	0.1309	0.1113	0.8500

Table B.1: Experimental data of density test (Continued)

Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
0.4500	0.7950	0.1264	0.1031	0.8155
0.4550	0.7900	0.1285	0.1085	0.8445
0.4600	0.8200	0.1363	0.1074	0.7881
0.4500	0.8150	0.1296	0.1123	0.8667
0.4600	0.8150	0.1354	0.1184	0.8743
0.4600	0.8000	0.1330	0.1080	0.8122
0.4650	0.8000	0.1359	0.1188	0.8742
0.4600	0.8000	0.1330	0.1072	0.8065
0.4550	0.7850	0.1276	0.1057	0.8283
0.4550	0.7800	0.1268	0.1064	0.8387
0.4650	0.8200	0.1393	0.1207	0.8669
0.4550	0.8400	0.1366	0.1108	0.8115
0.4600	0.7900	0.1313	0.1097	0.8359
0.4600	0.8000	0.1330	0.1093	0.8218
0.4550	0.8200	0.1333	0.1047	0.7856
0.4500	0.8150	0.1296	0.1085	0.8368
0.4500	0.8050	0.1280	0.1060	0.8276
0.4600	0.8000	0.1330	0.1090	0.8197
0.4550	0.7600	0.1236	0.1026	0.8301
0.4600	0.7750	0.1288	0.1030	0.8000
0.4550	0.8200	0.1333	0.1069	0.8020
0.4500	0.7900	0.1256	0.1013	0.8059
0.4550	0.7750	0.1260	0.1034	0.8202
0.4650	0.8050	0.1367	0.1117	0.8172
0.4650	0.8400	0.1427	0.1148	0.8045
0.4600	0.8000	0.1330	0.1127	0.8474
0.4500	0.7800	0.1241	0.1024	0.8254
0.4550	0.8050	0.1309	0.1140	0.8707
0.4550	0.8150	0.1325	0.1088	0.8213
0.4600	0.7800	0.1296	0.1131	0.8723

Table B.1: Experimental data of density test (Continued)

Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
0.4500	0.8100	0.1288	0.1118	0.8677
0.4500	0.8200	0.1304	0.1093	0.8382
0.4500	0.8150	0.1296	0.1050	0.8097
0.4500	0.7900	0.1256	0.1089	0.8664
0.4550	0.7700	0.1252	0.1029	0.8222
0.4500	0.8000	0.1272	0.1062	0.8347
0.4600	0.8100	0.1346	0.1161	0.8623
0.4600	0.7950	0.1321	0.1062	0.8038
0.4500	0.7800	0.1241	0.1052	0.8483
0.4550	0.8300	0.1350	0.1081	0.8009
0.4550	0.7600	0.1236	0.1079	0.8730
0.4550	0.7900	0.1285	0.1017	0.7916
0.4600	0.8300	0.1379	0.1160	0.8412
0.4550	0.8350	0.1358	0.1144	0.8426
0.4500	0.8000	0.1272	0.1038	0.8157
0.4650	0.7700	0.1308	0.1083	0.8279
0.4500	0.7750	0.1233	0.1053	0.8541
0.4550	0.7800	0.1268	0.1099	0.8667
0.4600	0.7850	0.1305	0.1088	0.8340
0.4550	0.7800	0.1268	0.1009	0.7955
0.4550	0.8000	0.1301	0.1110	0.8535
0.4550	0.7950	0.1293	0.1125	0.8701
0.4550	0.8100	0.1317	0.1052	0.7988
0.4600	0.7900	0.1313	0.1095	0.8340
0.4600	0.7950	0.1321	0.1044	0.7905
0.4500	0.7700	0.1225	0.0963	0.7861
0.4550	0.7700	0.1252	0.1068	0.8527
0.4500	0.7850	0.1248	0.1023	0.8195
0.4500	0.8050	0.1280	0.1033	0.8066
0.4650	0.8000	0.1359	0.1088	0.8012

Table B.1: Experimental data of density test (Continued)

	Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
	0.4600	0.7750	0.1288	0.1096	0.8511
	0.4600	0.7800	0.1296	0.1067	0.8228
	0.4550	0.7800	0.1268	0.1000	0.7886
	0.4500	0.7850	0.1248	0.1055	0.8453
	0.4500	0.7700	0.1225	0.0985	0.8046
	0.4600	0.7800	0.1296	0.1077	0.8306
	0.4550	0.8000	0.1301	0.1109	0.8522
	0.4600	0.7750	0.1288	0.1067	0.8282
	0.4500	0.8700	0.1384	0.1194	0.8628
	0.4575	0.8350	0.1373	0.1113	0.8106
B3	0.4480	0.8860	0.1397	0.1107	0.7926
	0.4600	0.9620	0.1599	0.1309	0.8186
	0.4600	0.8240	0.1369	0.1118	0.8166
	0.4600	0.8400	0.1396	0.1188	0.8506
	0.4500	0.9900	0.1575	0.1292	0.8206
	0.4500	0.7750	0.1233	0.1039	0.8429
	0.4475	0.8100	0.1274	0.1078	0.8458
	0.4425	0.8150	0.1253	0.1037	0.8277
	0.4575	0.7850	0.1290	0.1049	0.8125
	0.4350	0.8100	0.1204	0.0971	0.8065
	0.4500	0.8050	0.1280	0.1041	0.8130
	0.4500	0.7250	0.1153	0.0924	0.8015
	0.4500	0.8000	0.1272	0.1030	0.8095
	0.4375	0.8100	0.1218	0.1033	0.8484
	0.4525	0.7550	0.1214	0.0963	0.7928
	0.4500	0.8650	0.1376	0.1099	0.7988
	0.4550	0.8400	0.1366	0.1130	0.8276
	0.4300	0.9100	0.1322	0.1049	0.7939
	0.4450	0.7700	0.1198	0.0949	0.7926
	0.4550	0.8250	0.1341	0.1079	0.8041

Table B.1: Experimental data of density test (Continued)

Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
0.4550	0.7900	0.1285	0.1101	0.8573
0.4450	0.8150	0.1268	0.0993	0.7836
0.4450	0.8050	0.1252	0.1048	0.8371
0.4550	0.8000	0.1301	0.1054	0.8105
0.4450	0.7900	0.1229	0.1016	0.8272
0.4400	0.8050	0.1224	0.1043	0.8518
0.4450	0.7750	0.1205	0.1012	0.8399
0.4600	0.8150	0.1354	0.1119	0.8260
0.4400	0.8000	0.1216	0.1043	0.8577
0.4500	0.8150	0.1296	0.1041	0.8030
0.4450	0.7750	0.1205	0.0973	0.8073
0.4500	0.7800	0.1241	0.1023	0.8246
0.4500	0.8150	0.1296	0.1011	0.7801
0.4450	0.8050	0.1252	0.1069	0.8539
0.4550	0.8100	0.1317	0.1089	0.8271
0.4450	0.8200	0.1275	0.1090	0.8544
0.4500	0.7750	0.1233	0.1061	0.8611
0.4550	0.8200	0.1333	0.1061	0.7959
0.4400	0.7750	0.1178	0.0934	0.7925
0.4500	0.8000	0.1272	0.1091	0.8571
0.4500	0.8300	0.1320	0.1067	0.8085
0.4400	0.8100	0.1232	0.0975	0.7920
0.4600	0.8200	0.1363	0.1146	0.8409
0.4600	0.7800	0.1296	0.1081	0.8341
0.4600	0.8200	0.1363	0.1158	0.8495
0.4500	0.8000	0.1272	0.1011	0.7947
0.4400	0.8100	0.1232	0.1035	0.8401
0.4600	0.7850	0.1305	0.1079	0.8269
0.4400	0.8200	0.1247	0.1076	0.8627
0.4500	0.7750	0.1233	0.1059	0.8596

Table B.1: Experimental data of density test (Continued)

Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
0.4400	0.8250	0.1254	0.1040	0.8287
0.4500	0.7800	0.1241	0.0978	0.7882
0.4400	0.8100	0.1232	0.1029	0.8359
0.4500	0.8000	0.1272	0.0989	0.7770
0.4500	0.8200	0.1304	0.1099	0.8425
0.4450	0.7800	0.1213	0.0953	0.7857
0.4400	0.7900	0.1201	0.0952	0.7922
0.4550	0.7800	0.1268	0.0989	0.7801
0.4450	0.7850	0.1221	0.0953	0.7805
0.4500	0.7700	0.1225	0.0973	0.7948
0.4550	0.8000	0.1301	0.1018	0.7826
0.4500	0.7800	0.1241	0.0968	0.7806
0.4550	0.7750	0.1260	0.1032	0.8187
0.4500	0.7950	0.1264	0.1060	0.8380
0.4500	0.7850	0.1248	0.0987	0.7902
0.4500	0.8250	0.1312	0.1056	0.8049
0.4400	0.8150	0.1239	0.1064	0.8584
0.4500	0.8200	0.1304	0.1070	0.8202
0.4450	0.7800	0.1213	0.0957	0.7889
0.4550	0.7800	0.1268	0.1065	0.8398
0.4550	0.7950	0.1293	0.1090	0.8428
0.4600	0.7900	0.1313	0.1079	0.8215
0.4450	0.7900	0.1229	0.0996	0.8107
0.4500	0.8300	0.1320	0.1110	0.8409
0.4450	0.8050	0.1252	0.1044	0.8335
0.4400	0.8000	0.1216	0.1015	0.8344
0.4400	0.8250	0.1254	0.0989	0.7882
0.4600	0.8000	0.1330	0.1140	0.8572
0.4400	0.7950	0.1209	0.0962	0.7958
0.4500	0.8100	0.1288	0.1039	0.8068

Table B.1: Experimental data of density test (Continued)

	Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
	0.4500	0.7750	0.1233	0.1023	0.8298
	0.4600	0.8000	0.1330	0.1075	0.8089
	0.4450	0.7800	0.1213	0.0957	0.7891
	0.4500	0.7900	0.1256	0.1041	0.8282
	0.4400	0.7750	0.1178	0.0970	0.8230
	0.4400	0.8200	0.1247	0.1057	0.8481
	0.4500	0.8250	0.1312	0.1118	0.8524
	0.4500	0.8150	0.1296	0.1055	0.8139
	0.4550	0.7850	0.1276	0.1055	0.8264
	0.4500	0.8250	0.1312	0.1093	0.8328
	0.4450	0.8200	0.1275	0.1023	0.8018
	0.4500	0.8050	0.1280	0.1048	0.8189
	0.4500	0.8000	0.1272	0.1035	0.8136
	0.4450	0.7700	0.1198	0.0940	0.7852
	0.4450	0.8200	0.1275	0.1045	0.8198
	0.4450	0.8000	0.1244	0.0987	0.7933
	0.4500	0.7800	0.1241	0.0959	0.7731
	0.4500	0.8300	0.1320	0.1087	0.8236
	0.4500	0.7300	0.1161	0.0934	0.8045
	0.4500	0.8000	0.1272	0.1034	0.8127
B4	0.4533	0.9493	0.1532	0.1182	0.7717
	0.4560	0.9320	0.1522	0.1182	0.7763
	0.4530	0.8147	0.1313	0.1018	0.7755
	0.4400	0.7500	0.1140	0.0899	0.7881
	0.4400	0.8350	0.1270	0.1021	0.8038
	0.4500	0.8600	0.1368	0.1040	0.7600
	0.4400	0.7950	0.1209	0.0924	0.7640
	0.4450	0.7300	0.1135	0.0880	0.7749
	0.4375	0.7800	0.1173	0.0946	0.8068
	0.4450	0.7600	0.1182	0.0974	0.8236

Table B.1: Experimental data of density test (Continued)

Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
0.4475	0.8850	0.1392	0.1130	0.8118
0.4425	0.8100	0.1246	0.0991	0.7956
0.4550	0.8300	0.1350	0.1091	0.8086
0.4375	0.8650	0.1300	0.1016	0.7816
0.4275	0.7900	0.1134	0.0900	0.7939
0.4325	0.8300	0.1219	0.0981	0.8047
0.4500	0.7500	0.1193	0.0880	0.7378
0.4450	0.8450	0.1314	0.1065	0.8101
0.4350	0.7950	0.1182	0.0954	0.8071
0.4400	0.7800	0.1186	0.0952	0.8026
0.4450	0.7900	0.1229	0.0944	0.7680
0.4500	0.7800	0.1241	0.1027	0.8278
0.4450	0.8000	0.1244	0.1003	0.8065
0.4400	0.8150	0.1239	0.0959	0.7741
0.4350	0.8150	0.1211	0.0981	0.8099
0.4500	0.7900	0.1256	0.0969	0.7712
0.4400	0.8000	0.1216	0.0906	0.7451
0.4500	0.8200	0.1304	0.1025	0.7861
0.4350	0.7800	0.1159	0.0873	0.7533
0.4500	0.7750	0.1233	0.0994	0.8064
0.4350	0.8150	0.1211	0.0980	0.8092
0.4500	0.8000	0.1272	0.0992	0.7796
0.4450	0.8000	0.1244	0.1017	0.8176
0.4400	0.8050	0.1224	0.0935	0.7637
0.4500	0.8000	0.1272	0.1009	0.7933
0.4550	0.8000	0.1301	0.1024	0.7872
0.4350	0.7950	0.1182	0.0923	0.7812
0.4450	0.7900	0.1229	0.1010	0.8220
0.4400	0.7950	0.1209	0.1005	0.8316
0.4500	0.8100	0.1288	0.0959	0.7446
0.4500	0.8200	0.1304	0.1007	0.7719

Table B.1: Experimental data of density test (Continued)

Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
0.4400	0.7750	0.1178	0.0939	0.7964
0.4400	0.8000	0.1216	0.0984	0.8090
0.4450	0.7800	0.1213	0.0916	0.7551
0.4500	0.8300	0.1320	0.1033	0.7823
0.4400	0.7900	0.1201	0.0940	0.7824
0.4450	0.7950	0.1236	0.1028	0.8315
0.4450	0.8000	0.1244	0.1014	0.8154
0.4550	0.8050	0.1309	0.1019	0.7785
0.4500	0.7750	0.1233	0.1025	0.8313
0.4450	0.8050	0.1252	0.1002	0.8003
0.4500	0.8200	0.1304	0.1027	0.7876
0.4400	0.7950	0.1209	0.0981	0.8113
0.4450	0.7750	0.1205	0.0983	0.8157
0.4400	0.8000	0.1216	0.0936	0.7695
0.4500	0.8200	0.1304	0.1020	0.7817
0.4350	0.7750	0.1152	0.0904	0.7849
0.4450	0.8200	0.1275	0.1056	0.8283
0.4500	0.8000	0.1272	0.1023	0.8041
0.4500	0.7900	0.1256	0.0943	0.7505
0.4400	0.8000	0.1216	0.0992	0.8155
0.4400	0.8150	0.1239	0.1009	0.8139
0.4400	0.7950	0.1209	0.0977	0.8083
0.4350	0.8150	0.1211	0.0969	0.7997
0.4450	0.8000	0.1244	0.0999	0.8033
0.4500	0.8050	0.1280	0.1017	0.7947
0.4550	0.8150	0.1325	0.1040	0.7848
0.4450	0.8050	0.1252	0.1013	0.8092
0.4400	0.7900	0.1201	0.0953	0.7934
0.4450	0.7700	0.1198	0.0962	0.8030
0.4350	0.7750	0.1152	0.0878	0.7619
0.4550	0.8000	0.1301	0.1020	0.7841

Table B.1: Experimental data of density test (Continued)

	Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
	0.4500	0.7900	0.1256	0.1019	0.8107
	0.4350	0.7850	0.1167	0.0881	0.7553
	0.4550	0.7850	0.1276	0.1033	0.8091
	0.4400	0.8200	0.1247	0.0982	0.7874
	0.4450	0.8000	0.1244	0.0999	0.8029
	0.4350	0.8250	0.1226	0.0972	0.7927
	0.4450	0.8150	0.1268	0.0965	0.7617
	0.4500	0.8150	0.1296	0.0972	0.7498
	0.4400	0.7900	0.1201	0.0968	0.8056
	0.4450	0.7800	0.1213	0.0922	0.7599
	0.4400	0.7800	0.1186	0.0951	0.8015
	0.4350	0.8000	0.1189	0.0917	0.7715
	0.4450	0.8050	0.1252	0.0978	0.7815
	0.4450	0.8000	0.1244	0.1002	0.8054
	0.4450	0.7900	0.1229	0.0976	0.7946
	0.4500	0.7850	0.1248	0.0987	0.7905
	0.4450	0.8250	0.1283	0.0978	0.7623
	0.4500	0.7900	0.1256	0.1007	0.8015
	0.4450	0.8000	0.1244	0.0930	0.7474
	0.4450	0.7900	0.1229	0.1013	0.8242
	0.4350	0.7700	0.1144	0.0874	0.7635
	0.4450	0.8100	0.1260	0.1002	0.7956
	0.4550	0.7750	0.1260	0.0976	0.7744
	0.4450	0.8150	0.1268	0.1031	0.8137
	0.4450	0.7700	0.1198	0.0938	0.7830
	0.4400	0.8000	0.1216	0.0936	0.7694
	0.4375	0.7650	0.1150	0.0935	0.8130
	0.4400	0.7700	0.1171	0.0899	0.7680
B5	0.4367	0.8200	0.1228	0.0948	0.7717
	0.4383	0.7433	0.1122	0.0830	0.7401
	0.4133	0.7567	0.1015	0.0763	0.7514

Table B.1: Experimental data of density test (Continued)

Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
0.4187	0.7920	0.1090	0.0835	0.7662
0.4353	0.7800	0.1161	0.0891	0.7671
0.4340	0.8927	0.1321	0.0986	0.7463
0.4300	0.7000	0.1017	0.0785	0.7725
0.4200	0.8250	0.1143	0.0901	0.7881
0.4225	0.8400	0.1178	0.0917	0.7789
0.4050	0.8950	0.1153	0.0838	0.7270
0.4150	0.7850	0.1062	0.0832	0.7831
0.4050	0.8450	0.1089	0.0862	0.7922
0.4000	0.8800	0.1106	0.0837	0.7569
0.4225	0.8300	0.1164	0.0856	0.7358
0.4050	0.7300	0.0940	0.0728	0.7745
0.4350	0.7550	0.1122	0.0813	0.7241
0.4250	0.8250	0.1170	0.0880	0.7522
0.4175	0.7650	0.1047	0.0813	0.7761
0.4300	0.8204	0.1191	0.0935	0.7850
0.4300	0.7913	0.1149	0.0856	0.7451
0.4300	0.7742	0.1124	0.0825	0.7336
0.4250	0.7864	0.1116	0.0804	0.7206
0.4300	0.7874	0.1143	0.0857	0.7494
0.4300	0.8196	0.1190	0.0879	0.7383
0.4350	0.7935	0.1179	0.0847	0.7180
0.4300	0.8127	0.1180	0.0894	0.7577
0.4250	0.7749	0.1099	0.0859	0.7818
0.4250	0.8297	0.1177	0.0906	0.7699
0.4250	0.7960	0.1129	0.0867	0.7679
0.4300	0.7900	0.1147	0.0827	0.7212
0.4250	0.8177	0.1160	0.0832	0.7175
0.4300	0.7777	0.1129	0.0819	0.7251
0.4350	0.7800	0.1159	0.0899	0.7757

Table B.1: Experimental data of density test (Continued)

Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
0.4350	0.8161	0.1213	0.0959	0.7908
0.4250	0.8299	0.1177	0.0899	0.7634
0.4200	0.7962	0.1103	0.0844	0.7655
0.4250	0.8008	0.1136	0.0898	0.7909
0.4350	0.7992	0.1188	0.0911	0.7673
0.4250	0.8018	0.1138	0.0824	0.7246
0.4300	0.7760	0.1127	0.0872	0.7735
0.4350	0.8057	0.1197	0.0940	0.7854
0.4250	0.8035	0.1140	0.0880	0.7724
0.4350	0.7789	0.1158	0.0841	0.7269
0.4350	0.8053	0.1197	0.0959	0.8013
0.4250	0.7858	0.1115	0.0861	0.7723
0.4200	0.8185	0.1134	0.0909	0.8019
0.4350	0.8152	0.1212	0.0927	0.7648
0.4350	0.8134	0.1209	0.0943	0.7802
0.4250	0.8126	0.1153	0.0875	0.7590
0.4300	0.8124	0.1180	0.0862	0.7308
0.4300	0.7831	0.1137	0.0817	0.7184
0.4350	0.7779	0.1156	0.0899	0.7775
0.4350	0.7863	0.1169	0.0916	0.7834
0.4250	0.8218	0.1166	0.0836	0.7168
0.4300	0.7847	0.1140	0.0871	0.7639
0.4250	0.7758	0.1101	0.0868	0.7883
0.4250	0.8164	0.1158	0.0902	0.7785
0.4250	0.8028	0.1139	0.0914	0.8023
0.4300	0.8150	0.1184	0.0865	0.7310
0.4250	0.8091	0.1148	0.0830	0.7232
0.4350	0.8244	0.1225	0.0978	0.7980
0.4250	0.8210	0.1165	0.0920	0.7895
0.4200	0.8207	0.1137	0.0849	0.7471

Table B.1: Experimental data of density test (Continued)

Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
0.4250	0.7828	0.1111	0.0799	0.7192
0.4350	0.8262	0.1228	0.0925	0.7534
0.4250	0.8070	0.1145	0.0843	0.7360
0.4250	0.8084	0.1147	0.0917	0.7996
0.4300	0.8248	0.1198	0.0910	0.7595
0.4300	0.8258	0.1199	0.0928	0.7742
0.4250	0.8128	0.1153	0.0898	0.7787
0.4300	0.8073	0.1172	0.0874	0.7460
0.4350	0.7931	0.1179	0.0931	0.7898
0.4250	0.7926	0.1124	0.0850	0.7563
0.4250	0.7956	0.1129	0.0871	0.7719
0.4250	0.7879	0.1118	0.0807	0.7223
0.4350	0.8005	0.1190	0.0957	0.8042
0.4350	0.7827	0.1163	0.0892	0.7670
0.4250	0.7927	0.1125	0.0875	0.7779
0.4300	0.7752	0.1126	0.0866	0.7695
0.4250	0.8251	0.1171	0.0913	0.7801
0.4300	0.7704	0.1119	0.0811	0.7249
0.4300	0.8290	0.1204	0.0878	0.7290
0.4350	0.7906	0.1175	0.0845	0.7194
0.4300	0.7956	0.1155	0.0922	0.7976
0.4250	0.8218	0.1166	0.0903	0.7747
0.4350	0.8287	0.1232	0.0983	0.7986
0.4350	0.8271	0.1229	0.0938	0.7630
0.4300	0.8251	0.1198	0.0920	0.7675
0.4250	0.8246	0.1170	0.0914	0.7809
0.4250	0.7926	0.1124	0.0846	0.7521
0.4350	0.7957	0.1183	0.0919	0.7770
0.4350	0.7707	0.1145	0.0909	0.7939
0.4300	0.7986	0.1160	0.0895	0.7717

Table B.1: Experimental data of density test (Continued)

Diameter (cm)	Height (cm)	Volume (cm^3)	Weight (g)	Density (g/cm^3)
0.4300	0.7794	0.1132	0.0868	0.7665
0.4350	0.7883	0.1172	0.0878	0.7493
0.4250	0.7789	0.1105	0.0818	0.7401
0.4200	0.8183	0.1134	0.0892	0.7873
0.4250	0.7876	0.1117	0.0823	0.7366
0.4100	0.6200	0.0819	0.0656	0.8017
0.4250	0.7100	0.1007	0.0753	0.7480

Table B.2 : Summary of density test

Water content (%)	A		B	
	Average density (g/cm^3)	Standard deviation	Average density (g/cm^3)	Standard deviation
40.00	1.0174	0.0271	0.9106	0.0255
42.50	0.9574	0.0236	0.8304	0.0254
45.00	0.9398	0.0274	0.8183	0.0226
47.50	0.8945	0.0265	0.7903	0.0243
50.00	0.8168	0.0287	0.7613	0.0255

APPENDIX C

The Experimental Data of Abrasion Resistance Test

Table C.1: Experimental data of abrasion resistance test

	Weight at the beginning (g)	Weight at the end (g)	Abrasion loss (g)	Abrasion resistance (%)
A1	50.16	49.41	0.75	98.50
	49.28	48.65	0.63	98.72
	50.23	49.52	0.71	98.59
A2	50.07	49.24	0.83	98.33
	50.27	49.54	0.72	98.56
	50.05	49.29	0.76	98.48
A3	49.82	48.87	0.95	98.09
	49.75	48.89	0.86	98.27
	50.03	49.11	0.92	98.16
A4	50.19	49.35	0.83	98.34
	51.32	50.28	1.04	97.97
	50.04	49.16	0.88	98.25
A5	49.76	48.16	1.60	96.78
	48.43	46.95	1.48	96.94
	49.80	48.23	1.57	96.85
B1	51.47	48.42	3.05	94.07
	50.97	48.26	2.71	94.68
	50.05	47.52	2.53	94.95
B2	51.19	47.63	3.56	93.05
	50.45	46.73	3.72	92.62
	50.29	46.33	3.97	92.11
B3	51.81	48.25	3.57	93.12
	49.76	46.43	3.33	93.31
	50.02	46.69	3.33	93.35
B4	50.77	46.73	4.04	92.04
	50.39	46.50	3.90	92.26
	50.19	46.18	4.00	92.03
B5	51.44	47.82	3.61	92.98
	50.64	46.76	3.89	92.33
	50.42	46.52	3.90	92.26

Table C.2 : Summary of abrasion resistance test

Water content (%)	A		B	
	Abrasion resistance (%)	Standard deviation	Abrasion resistance (%)	Standard deviation
40.00	98.60429	0.109493	94.37627	0.433987
42.50	98.4491	0.161676	92.83255	0.301057
45.00	98.1752	0.089943	93.2133	0.135941
47.50	98.15714	0.261664	92.14983	0.160326
50.00	96.85867	0.080334	92.65151	0.460526

APPENDIX D

The Experimental Data of Water Adsorption Test

Table D.1: Experimental data of water adsorption test

	Percentage of adsorbed water in the cat-litter at different time													
	10	**20**	**30**	**40**	**50**	**60**	**90**	**120**	**150**	**180**	**210**	**240**	**270**	**300**
A1	42.8090	44.1963	46.2633	46.3187	47.3714	47.9512	49.4145	51.3721	52.3199	52.2550	52.8398	52.2305	52.6620	52.4293
	40.7441	44.7219	45.6972	47.1260	49.1756	49.2151	51.3593	51.1753	52.3261	52.3541	52.3106	52.5616	52.2956	52.8450
	41.9179	45.7636	44.9162	46.0894	47.7441	48.3342	51.3605	52.0665	52.7645	53.1147	52.7540	53.2097	53.4725	53.5854
Average	41.8237	44.8939	45.6256	46.5114	48.0971	48.5002	50.7114	51.5380	52.4702	52.5746	52.6348	52.6673	52.8100	52.9532
S.D.	1.0357	0.7977	0.6764	0.5445	0.9525	0.6481	1.1232	0.4682	0.2549	0.4704	0.2840	0.4980	0.6022	0.5856
A2	53.2960	56.5353	59.1531	59.8880	60.6490	61.9579	61.5229	61.6029	63.0878	63.4477	63.7077	63.2378	63.6177	63.3577
	52.3511	57.7610	58.4681	59.2398	60.0974	60.7920	61.7316	61.9914	62.3463	62.6211	62.8360	62.6261	63.0959	62.9860
	51.1084	54.8212	58.1148	60.3056	60.7747	60.8645	62.1471	62.3467	62.0572	61.8726	62.4664	62.3467	62.5662	62.7060
Average	52.2518	56.3725	58.5787	59.8111	60.5070	61.2048	61.8005	61.9803	62.4971	62.6472	63.0034	62.7369	63.0933	63.0166
S.D.	1.0972	1.4766	0.5279	0.5371	0.3603	0.6532	0.3177	0.3720	0.5316	0.7879	0.6373	0.4557	0.5257	0.3270
A3	55.4123	58.1004	58.8785	59.5847	59.9325	60.4920	62.3127	62.7923	63.1965	63.5369	63.6412	63.5903	63.6886	63.7001
	53.1318	57.4351	58.1570	58.9815	61.7118	61.8828	62.9367	63.3442	63.4522	63.8202	63.9167	64.2061	64.3391	64.1367
	54.2432	57.0144	58.0436	59.3646	59.9608	60.7484	62.4938	62.5527	62.9737	63.1730	63.7973	63.9611	64.0150	64.0310
Average	54.2624	57.5166	58.3597	59.3102	60.5351	61.0411	62.5811	62.8964	63.2075	63.5100	63.7850	63.9192	64.0143	63.9559
S.D.	1.1404	0.5476	0.4528	0.3052	1.0192	0.7401	0.3211	0.4059	0.2394	0.3244	0.1381	0.3100	0.3253	0.2277
A4	53.6783	59.8417	60.5188	61.4779	62.7473	63.7168	65.3834	68.1578	67.7935	68.5221	67.3944	68.1179	67.7935	67.8135
	54.7836	59.2868	60.1179	60.8059	62.5678	63.7352	65.6922	68.1247	68.2414	68.2314	68.4709	68.0718	68.3561	68.2763
	54.8811	60.8722	60.9982	63.5205	63.2437	63.5815	66.2228	66.4676	66.7674	66.7874	66.9473	66.8224	67.1722	67.1122
Average	54.4477	60.0003	60.5450	61.9348	62.8530	63.6778	65.7662	67.5834	67.6008	67.8470	67.6042	67.6707	67.7740	67.7340
S.D.	0.6681	0.8045	0.4407	1.4138	0.3501	0.0839	0.4245	0.9664	0.7557	0.9290	0.7832	0.7350	0.5922	0.5861
A5	56.1950	61.6043	61.3908	64.2562	65.1123	64.9898	65.8046	66.2182	67.1082	67.1445	67.2276	67.0250	67.2201	67.3436
	57.5526	61.6604	62.7218	63.1622	63.6766	64.3765	66.6002	66.7961	67.6705	68.0510	68.4464	68.4454	68.3014	68.3969
	57.2720	61.5965	62.1011	63.5702	63.9359	63.5452	65.5379	66.9975	67.5425	68.3518	68.4817	68.5811	68.7159	68.6205
Average	57.0065	61.6204	62.0712	63.6629	64.2416	64.3039	65.9809	66.6706	67.4404	67.8491	68.0519	68.0172	68.0792	68.1203
S.D.	0.7167	0.0349	0.6660	0.5528	0.7651	0.7250	0.5527	0.4045	0.2948	0.6285	0.7141	0.8619	0.7723	0.6819

Table D.1: Experimental data of water adsorption test (continued)

	Percentage of adsorbed water in the cat-litter at different time													
	10	**20**	**30**	**40**	**50**	**60**	**90**	**120**	**150**	**180**	**210**	**240**	**270**	**300**
B1	48.6851	50.4282	53.4398	53.5892	56.4918	56.0985	57.1988	57.3183	57.1490	57.5025	57.0743	56.4320	57.2386	57.2884
	50.2225	51.7499	52.5965	53.2585	55.6873	56.7325	56.8270	56.9515	56.4936	57.0759	56.7623	57.4442	57.0012	57.1605
	49.0414	52.1145	53.1216	54.3904	55.8031	55.3015	56.6992	57.2366	57.2565	57.1520	56.8684	57.0525	57.4058	57.3859
Average	49.3163	51.4309	53.0526	53.7460	55.9940	56.0441	56.9083	57.1688	56.9664	57.2435	56.9017	56.9762	57.2152	57.2783
S.D.	0.8047	0.8873	0.4258	0.5821	0.4349	0.7170	0.2595	0.1926	0.4130	0.2275	0.1586	0.5104	0.2033	0.1130
B2	53.3231	60.2372	61.6510	63.5069	65.1540	65.6036	66.8335	67.1677	67.2317	66.9914	67.6308	67.5434	67.6488	67.5209
	52.6964	60.2266	62.3311	63.9295	65.1953	64.2500	65.4148	66.7100	66.5492	67.2018	67.1211	67.1356	66.7737	66.9603
	50.3663	59.7875	60.3381	63.0832	63.8453	64.2403	66.3305	65.8816	65.9779	66.5644	66.5654	66.7145	66.4961	66.6412
Average	52.1286	60.0838	61.4401	63.5065	64.7315	64.6980	66.1929	66.5865	66.5863	66.9192	67.1058	67.1312	66.9729	67.0408
S.D.	1.5580	0.2566	1.0131	0.4231	0.7678	0.7843	0.7193	0.6519	0.6277	0.3247	0.5329	0.4145	0.6016	0.4453
B3	51.4044	59.8812	62.5754	63.2685	63.4559	64.9821	65.7794	67.0057	67.4138	67.7352	67.6714	67.8986	67.7735	67.7391
	52.6603	61.1072	62.3786	62.6188	63.2734	63.7029	65.9613	66.9608	67.0669	67.5347	67.7350	67.8885	67.4705	67.7445
	53.8876	58.9987	61.2634	62.5097	63.0929	64.1343	65.0151	66.7439	67.1019	67.5859	67.4613	67.6786	67.6971	67.7758
Average	52.6507	59.9957	62.0725	62.7990	63.2741	64.2731	65.5853	66.9035	67.1942	67.6186	67.6226	67.8219	67.6470	67.7532
S.D.	1.2416	1.0589	0.7076	0.4103	0.1815	0.6508	0.5021	0.1400	0.1910	0.1041	0.1433	0.1242	0.1576	0.0198
B4	57.9018	65.5787	67.4200	68.6330	69.4446	69.6437	70.2149	70.1402	70.6894	70.7835	70.6251	70.7277	70.8826	70.7252
	57.1284	65.2859	68.4884	68.7206	69.2239	69.8465	70.2110	70.6813	71.0453	70.9809	70.9400	71.5716	71.1247	71.0923
	57.0275	65.3136	68.2147	69.0983	68.5991	69.4766	70.4964	70.7725	71.2082	71.4408	71.3111	71.2167	71.4658	71.3725
Average	57.3526	65.3928	68.0411	68.8173	69.0892	69.6556	70.3074	70.5313	70.9810	71.0684	70.9587	71.1720	71.1577	71.0633
S.D.	0.4783	0.1616	0.5550	0.2473	0.4385	0.1852	0.1637	0.3418	0.2653	0.3373	0.3433	0.4237	0.2930	0.3246
B5	58.8777	66.9655	69.5075	70.7523	71.7360	71.4235	72.7217	73.1602	72.8318	73.9286	72.7984	73.9635	73.6485	73.7686
	61.0378	69.5449	70.9117	71.7247	71.9739	72.5665	72.3567	72.6308	73.3033	73.3616	73.6093	74.0165	73.7504	73.8620
	60.1492	68.4655	69.3591	72.2411	72.4480	72.8680	72.7453	72.9083	73.4065	73.4913	73.8344	73.7686	73.9297	73.5502
Average	60.0216	68.3253	69.9261	71.5727	72.0526	72.2860	72.6079	72.8998	73.1805	73.5938	73.4140	73.9162	73.7762	73.7269
S.D.	1.0857	1.2954	0.8568	0.7560	0.3625	0.7620	0.2178	0.2648	0.3064	0.2971	0.5449	0.1306	0.1423	0.1601

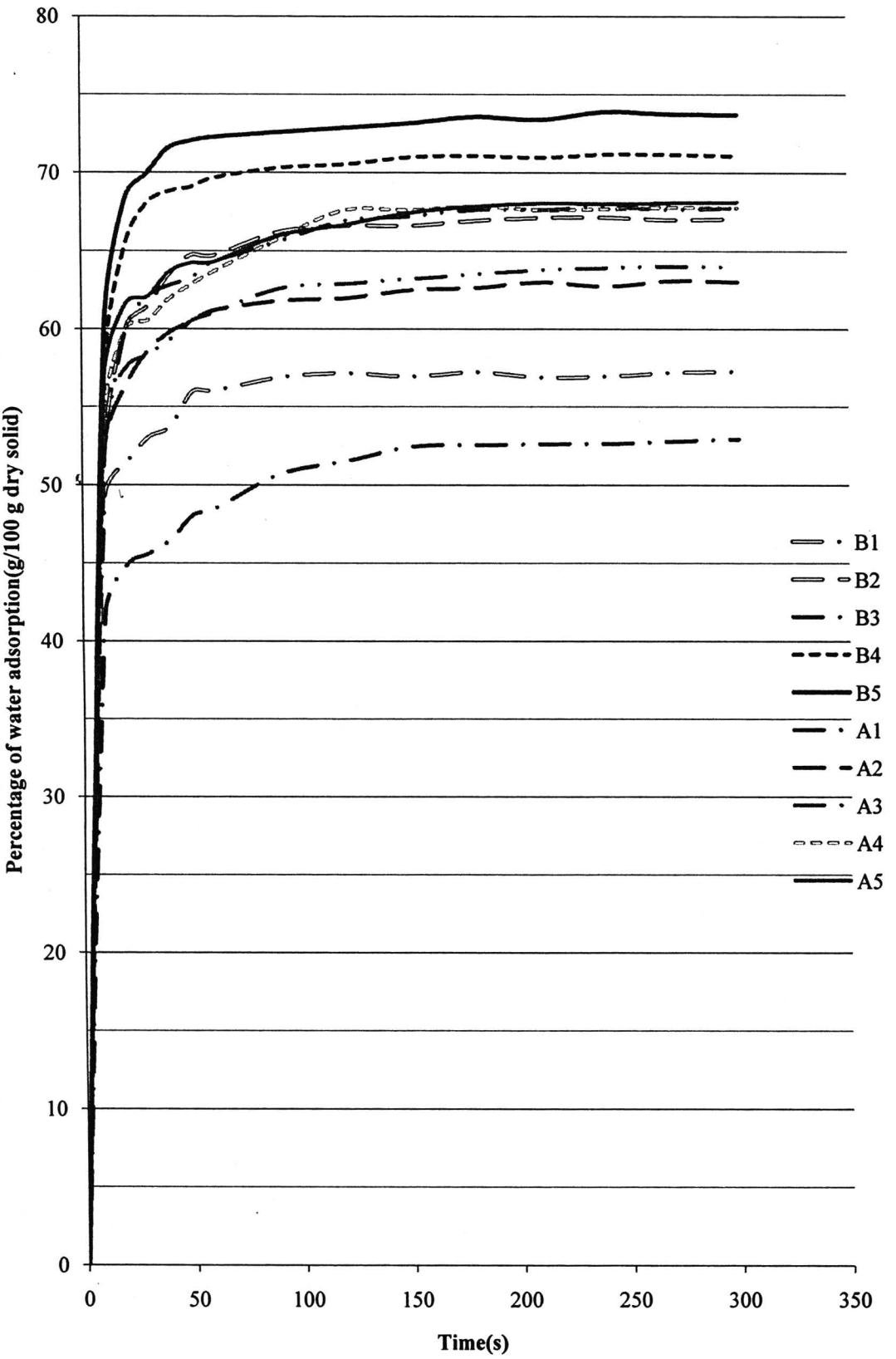

Figure D.1 : Percentage of water adsorption at different time

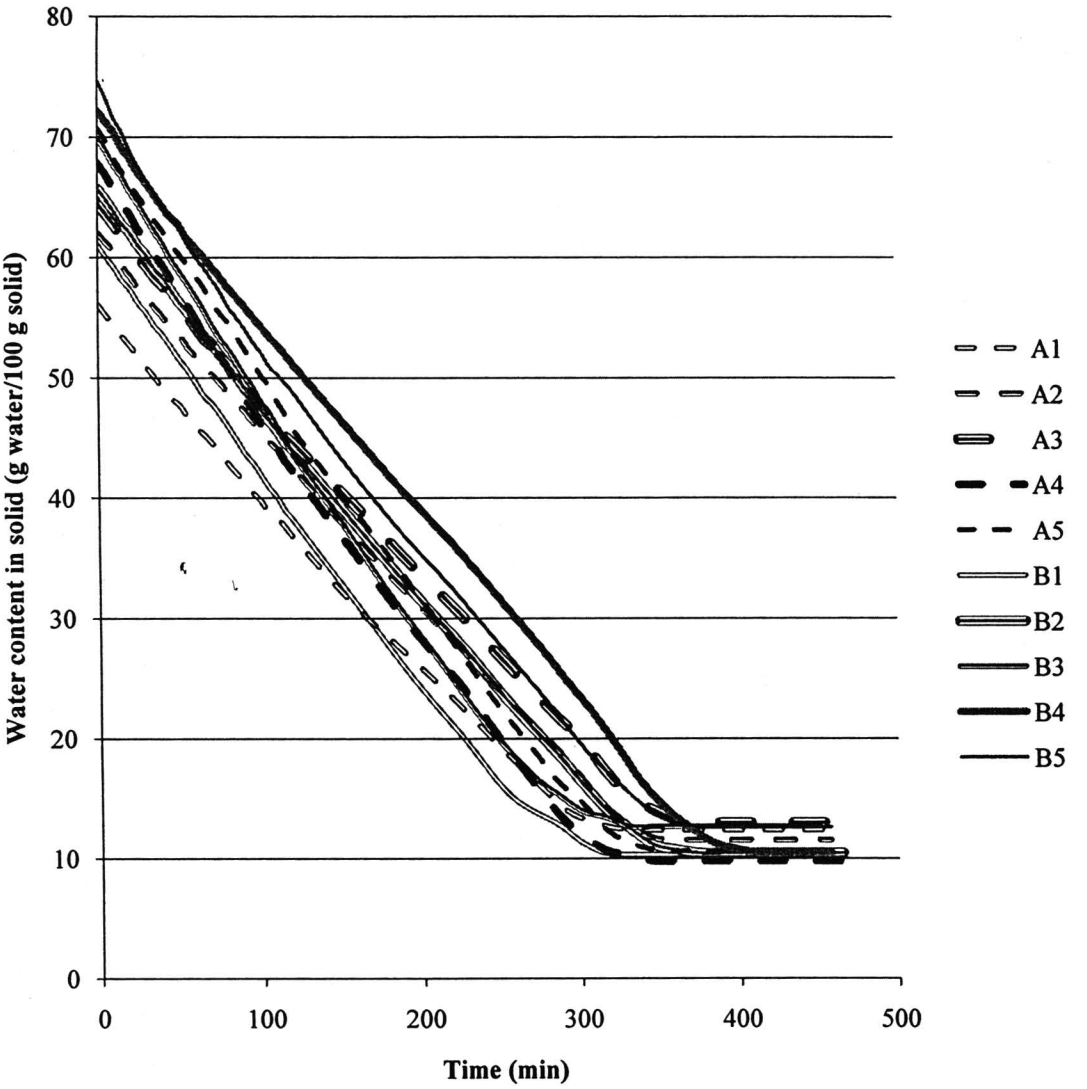

Figure D.2 : Water content in the obtained cat-litter during the desorption

Table D.2 : Initial desorption rate of the obtained cat-litter (first 4 hours)

The obtained cat-litter	Initial rate (g water/100 g solid·min.)	R-square
A1	0.1526	0.9968
A2	0.1585	0.9984
A3	0.1487	0.9966
A4	0.1902	0.9956
A5	0.1916	0.9989
B1	0.1788	0.9987
B2	0.1726	0.9974
B3	0.2017	0.9982
B4	0.1605	0.9969
B5	0.2018	0.9905

Table D.3 : Swelling percentage of paper pulp and coconut coir

	Volume (cm^3)		Percent of swelling (%)
	Before adsorption	After adsorption	
Paper pulp	7.47	7.63	102.17
	9.53	9.55	100.31
	9.19	9.29	101.12
	10.57	10.85	102.67
	8.98	9.26	103.16
	8.77	8.92	101.75
	10.33	10.39	100.62
	9.95	10.07	101.15
	7.74	7.89	101.89
	8.81	8.96	101.71
		average	101.65
Coconut coir	10.08	12.07	119.73
	10.22	12.34	120.71
	7.53	9.26	122.93
	9.17	10.81	117.88
	7.73	9.08	117.42
	9.69	12.01	123.88
	9.86	11.86	120.25
	9.22	11.30	122.60
	10.73	12.78	119.09
	7.73	9.30	120.22
		average	120.47

CURRICULUM VITAE

NAME	Mr. Nattawut Chaimananun
DATE OF BIRTH	29 July 1987

EDUCATIONAL RECORD

HIGH SCHOOL	High School Graduation Taweethapisek School, 2004
BACHELOR'S DEGREE	Bachelor of Engineering (Chemical Engineering) Chulalongkorn University, 2008
MASTER'S DEGREE	Master of Engineering (Chemical Engineering) King Mongkut's University of Technology Thonburi, 2010

King Mongkut's University of Technology Thonburi
Agreement on Intellectual Property Rights Transfer for Postgraduate Students

Date.....24 December 2010.....

Name.....Nattawut.....Middle Name.....-.....
Surname/Family Name.....Chaimananun.....
Student Number...52403804..... who is a student of King's Mongkut's University of Technology Thonburi (KMUTT) in ○ Graduate Diploma ◉ Master Degree
○ Doctoral Degree
Program.....Master of Engineering.....Field of Study...Chemical Engineering....
Faculty/School.....Engineering.....
Home Address ...195/1..... Soi.....-.....Road ...Taksin-Petchkasem....
Tambon ...Bukkhalo..... District.....Thonburi.....Province.....Bangkok.....
Postal Code.....10600.....Country.....Thailand.....

I, as 'Transferer', hereby transfer the ownership of my special research project copyright to King's Mongkut's University of Technology Thonburi who has appointed Assoc. **Prof. Dr. Piyabutr Wanichpongpan Associate Dean for Academic Affairs (Acting for Dean)** to be 'Transferee' of copyright ownership under the 'Agreement' as follows.

1. I am the author of the special research project entitled... The Study Of Cat-Litter Preparation from Phosphogypsum with Paper and Coconut Coir.....
under the supervision of .....Dr. Jindarat Pimsamarn.....
who is my supervisor, and/or.....-.....
who is/are my co-supervisor(s), in accordance with the Thai Copyright Act B.E. 2537. The special research project is a part of the curriculum of KMUTT.

2. I hereby transfer the copyright ownership of all my works in the special research project to KMUTT throughout the copyright protection period in accordance with the Thai Copyright Act B.E. 2537, effective on the approval date of special research project proposal consented by KMUTT.

3. To have the special research project distributed in any form of media, I shall in each and every case stipulate the special research project as the work of KMUTT.

4. For my own distribution of special research project or the reproduction, adjustment, or distribution of special research project by the third party in accordance with the Thai Copyright Act B.E. 2537 with remuneration in return, I am subject to obtain a prior written permission from KMUTT.

5. To use any information from my special research project to make an invention or create any intellectual property works within ten (10) years from the date of signing this Agreement, I am subject to obtain prior written permission from KMUTT, and KMUTT is entitled to have intellectual property rights on such inventions or intellectual property works, including entitling to take royalty from licensing together with the distribution of any benefit deriving partly or wholly from the works in the future, conforming with the Regulation of King Mongkut's Institute of Technology Thonburi *Re* the Administration of Benefits deriving from Intellectual Property B.E. 2538.

6. If the benefits arise from my special research project or my intellectual property works owned by KMUTT, I shall be entitled to gain the benefits according to the allocation rate stated in the Regulation of King Mongkut's Institute of Technology Thonburi *Re* the Administration of Benefits deriving from Intellectual Property B.E. 2538.

Signature.....Nattawut Chaimananun.....Transferor
(Mr. Nattawut Chaimananun)
Student

Signature.....Transferee
(Assoc. Prof. Dr. Piyabutr Wanichpongpan)
Associate Dean for Academic Affairs (Acting for Dean)

Signature.....Witness
(Assoc. Prof. Dr. Anawat Sungpet)

Signature.....Witness
(Dr. Jindarat Pimsamarn)