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APPENDICES

APPENDIX A

Particle Size Measurement

Particle size of starch and the concentrated NR latex was measured by using Mastersizer S. The diagram of Mastersizer S is schematically presented in Figure A The instrument is composed of an optical unit which includes the basic particle size sensor interfaced with a system to aid computer to manages the measurement and performs result analysis and presentation.

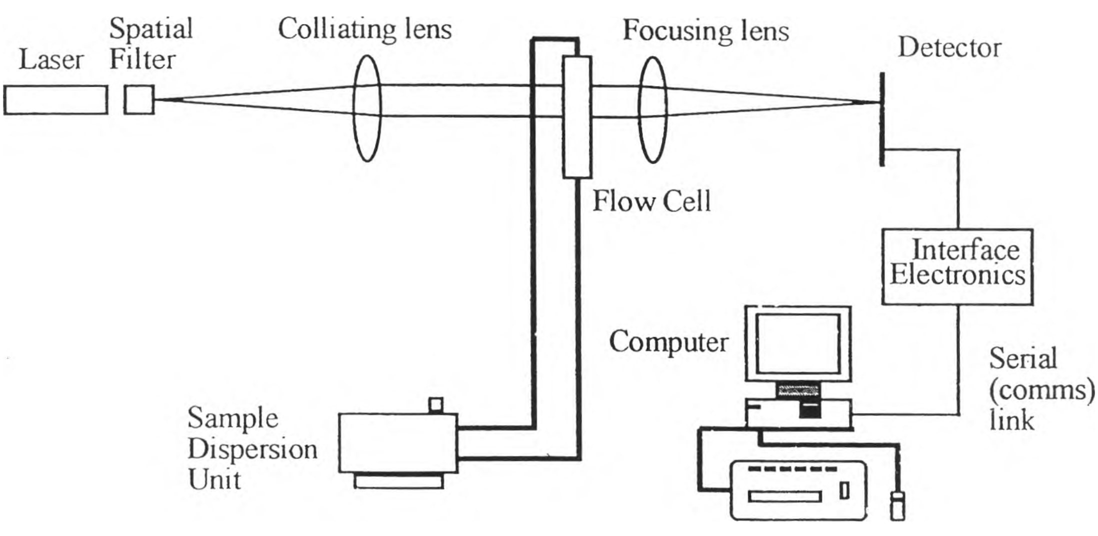

Figure A: Schematic diagram of Mastersizer S [29]

The principle of Mastersizer is based on laser light scattering both diffusion and diffraction. The refractive index of the material must be different from the medium in which it is supported. The Mastersizer S employs two forms of optical configuration to provide its unique specification. The first is the well-known optical method, called "Conventional Fourier Optics". The second is called "Reverse Fourier Optics", used in order to allow the measurement size range to be extended down to 0.05 μm.

APPENDIX B

Table B.1: Half-life temperature for commercial peroxides [30]

Chemical Name	Solvent[a]	E_a[b] kJ/mole	ln(A)	Half-life Temperature, °C 10-hr	1-hr	1-min	1-sec
Class: Diacyl Peroxides							
Di(2,4-dichlorobenzoyl) peroxide	Benzene	117.2	32.3	54	73	111	160
Diisononanoyl peroxide	TCE	129.7	35.9	61	78	114	158
Dibenzoyl peroxide	Benzene	128.9	33.9	73	92	131	179
Di(decanoyl) peroxide	TCE	128.4	34.9	65	83	120	165
Dilauroyl peroxide	TCE	130.1	35.6	64	81	117	162
Succinic acid peroxide	Acetone	97.5	23.7	66	90	143	214
Class: Dialkyl Peroxides							
1,3(4)-Di(1-(*tert*-butylperoxy)-1-methylethyl)benzene	Dodecane	154.0	36.4	119	139	181	231
2,5-Di(*tert*-butylperoxy)-2,5-dimethyl-3-hexyne	Dodecane	159.4	36.6	131	152	194	246
2,5-Di(*tert*-butylperoxy)-2,5-dimethylhexane	Dodecane	155.6	36.7	120	140	181	232
Di-α-cumyl peroxide	Decane	154.0	36.6	117	137	178	228
Di-*tert*-amyl peroxide	Dodecane	159.4	37.5	123	143	184	233
Di-*tert*-butyl peroxide	Decane	164.8	38.4	129	149	189	238
tert-Butyl α-cumyl peroxide	Dodecane	158.2	37.0	124	144	185	235
Class: Diperoxyketals							
1,1-Di(*tert*-amylperoxy)cyclohexane	Dodecane	144.8	36.6	93	112	150	197
1,1-Di(*tert*-butylperoxy)-3,3,5-trimethylcyclohexane	Dodecane	148.5	37.5	96	115	153	199
1,1-Di(*tert*-butylperoxy)cyclohexane	Dodecane	144.8	36.2	97	116	155	203
2,2-Di(*tert*-amylperoxy)propane	Dodecane	144.3	34.8	108	128	170	222
2,2-Di(*tert*-butylperoxy)butane	Dodecane	143.5	34.5	107	127	169	221
Ethyl 3,3-di(*tert*-amylperoxy)butyrate	Dodecane	148.5	35.6	112	132	173	224
Ethyl 3,3-di(*tert*-butylperoxy)butyrate	Dodecane	151.5	36.2	114	134	175	225
n-Butyl 4,4-di(*tert*-butylperoxy)valerate	Dodecane	147.7	35.6	109	129	170	220
Class: Peroxydicarbonates							
Di(2-ethylhexyl) peroxydicarbonate	TCE	127.6	36.7	49	66	99	140
Di(2-phenoxyethyl) peroxydicarbonate	TCE	128.0	36.8	50	67	101	142
Dicyclohexyl peroxydicarbonate	TCE	123.8	35.3	50	67	102	145
Di(hexadecyl) peroxydicarbonate	TCE	125.1	35.8	50	67	101	143
Diisopropyl peroxydicarbonate	TCE	123.8	35.2	50	67	102	146
Di-*n*-propyl peroxydicarbonate	TCE	128.4	37.1	50	66	99	140
Di-*sec*-butyl peroxydicarbonate	TCE	116.7	32.5	51	69	107	154
Class: Peroxyesters							
2,5-Di(2-ethylhexanoylperoxy)-2,5-dimethylhexane	Decane	131.4	34.8	73	91	129	176
2,5-Dibenzoylperoxy-2,5-dimethylhexane	Benzene	152.3	38.2	100	118	156	202
3-Hydroxy-1,1-dimethylbutyl 2-ethylperoxyhexanoate	AMS	115.0	31.2	65	82	125	177
3-Hydroxy-1,1-dimethylbutyl peroxyneodecanoate	TCE	111.3	32.3	37	54	91	136
3-Hydroxy-1,1-dimethylbutyl peroxyneoheptanoate	AMS	115.1	33.2	41	58	92	139
α-Cumyl peroxyneodecanoate	TCE	111.3	32.0	38	56	93	139
α-Cumyl peroxyneoheptanoate	TCE	115.9	33.4	43	60	96	141
Di-*tert*-butyl diperoxyphthalate	Benzene	155.2	39.6	104	122	159	203
OO-*tert*-amyl O-(2-ethylhexyl) monoperoxycarbonate	Dodecane	150.6	37.8	99	117	155	201
OO-*tert*-butyl O-(2-ethylhexyl) monoperoxycarbonate	Dodecane	151.8	37.7	100	121	166	222
OO-*tert*-butyl O-isopropyl monoperoxycarbonate	Benzene	142.3	35.2	99	118	159	208
tert-Amyl 2-ethylperoxyhexanoate	TCE	141.8	38.4	73	90	125	167
tert-Amyl peroxyacetate	Dodecane	139.3	34.1	100	120	162	214
tert-Amyl peroxybenzoate	Dodecane	138.8	33.9	100	120	162	214
tert-Amyl peroxyneodecanoate	TCE	120.5	34.5	46	64	99	143
tert-Amyl peroxypivalate	TCE	117.6	32.2	55	74	112	161
tert-Butyl 2-ethylperoxyhexanoate	Dodecane	142.7	38.1	77	95	130	173
tert-Butyl 3,5,5-trimethylperoxyhexanoate	Benzene	138.9	33.7	101	122	164	217
tert-Butyl peroxymaleate	Acetone	113.0	26.9	87	111	161	226
tert-Butyl peroxyacetate	Decane	137.7	33.3	102	123	166	219
tert-Butyl peroxybenzoate	Dodecane	132.2	31.4	104	125	171	228
tert-Butyl peroxyisobutyrate	Decane	123.8	31.1	82	102	146	200
tert-Butyl peroxyneodecanoate	TCE	119.2	33.7	48	66	102	147
tert-Butyl peroxyneoheptanoate	TCE	113.4	31.0	53	72	112	162
tert-Butyl peroxypivalate	TCE	117.6	32.0	58	76	116	165

[a] TCE = trichloroethylene, AMS = α-methylstyrene.
[b] To change from kilojoules to kilocalories, divide by 4.184.

VITA

Ms Piyawan Surunchanajirasakul was born on October 25, 1971 in Mahasarakham. She graduated with a Bachelor Degree of Science (Chemistry) from Burapha Unversity in 1994. She has joined the National Metal and Material Technology Center (MTEC) since 1996. In 1998, she was accepted as a graduate student in the Program of Petrochemistry and Polymer Science, Faculty of Science, Chulalongkorn University. She received a Master's Degree of Science in Polymer Science, in October 2000.