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APPENDICES

Appendix A: Preparation of PolyHIPE

TABLE A1 Preparation of PolyHIPE reference

Recipe	Surfactant ratio	Oil phase				Aqueous phase		
		VBC (mL)	DVB (mL)	SpanR 80 (g)	Toluene (mL)	Triton X-100 (g)	$K_2S_2O_8$ (g)	Water (mL)
1	1	0.1	0.9	0.2	1	0.2	0.04	18
2	1.18	0.1	0.9	0.2	1	0.17	0.04	18
3	1.33	0.1	0.9	0.2	1	0.15	0.04	18
4	1.54	0.1	0.9	0.2	1	0.13	0.04	18
5	2	0.1	0.9	0.2	1	0.10	0.04	18
6	4	0.1	0.9	0.2	1	0.05	0.04	18

TABLE A 2 Preparation of PolyHIPE with amines

Recipe	DVB (mL)	VBC (mL)	Amine (mL)	Toluene (mL)	SpanR80 (g)	Water (mL)	$K_2S_2O_8$ (g)	Triton x-100 (g)	Surfactant ratio
7	1.8	0.2	0.2	2	0.6	36	0.08	0.50	1.20
8	1.8	0.2	0.2	2	0.6	36	0.08	0.45	1.33
9	1.8	0.2	0.2	2	0.6	36	0.08	0.40	1.50
10	1.8	0.2	0.2	2	0.6	36	0.08	0.35	1.71
11	1.8	0.2	0.2	2	0.65	36	0.08	0.90	0.72
12	1.8	0.2	0.2	2	0.65	36	0.08	0.85	0.76
13	1.8	0.2	0.2	2	0.65	36	0.08	0.80	0.81
14	1.8	0.2	0.2	2	0.65	36	0.08	0.75	0.87
15	1.8	0.2	0.2	2	0.65	36	0.08	0.70	0.93

A.3 Scanning electron microscope pictures

Scanning electron microscope (SEM) was used to observe the morphology of polyHIPE and interpreted the optimum condition of emulsion system when the ratio of surfactant was varied.

A.3.1 PolyHIPE reference

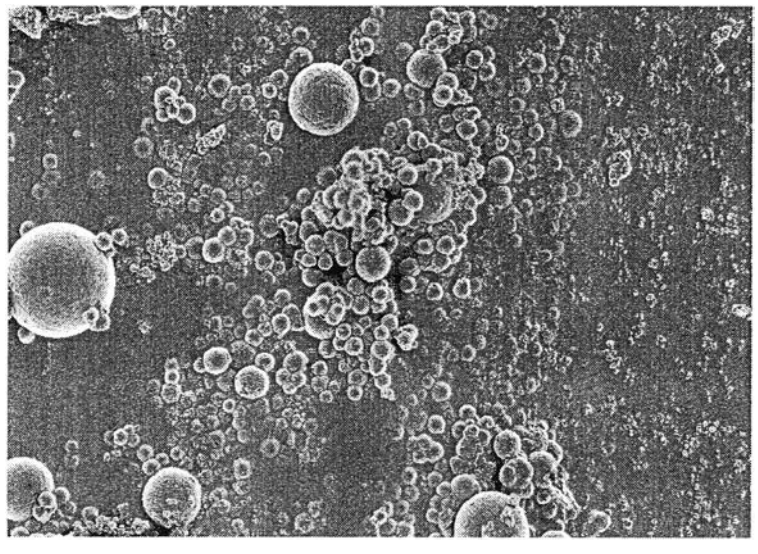

Figure A1 SEM of polyHIPE with SpanR80:Triton X-100 = 1.00 at magnifications of x10K

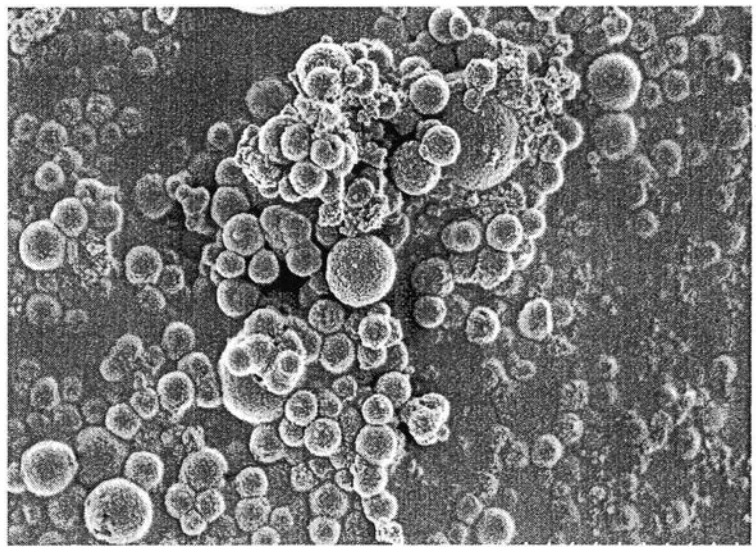

Figure A2 SEM of polyHIPE with SpanR80:Triton X-100 = 1.00 at magnifications of x20K

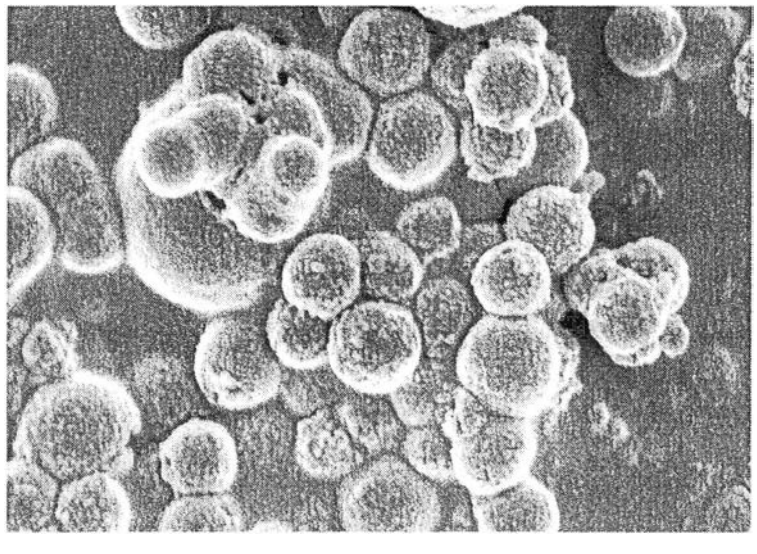

Figure A3 SEM of polyHIPE with SpanR80:Triton X-100 = 1.00 at magnifications of x50K.

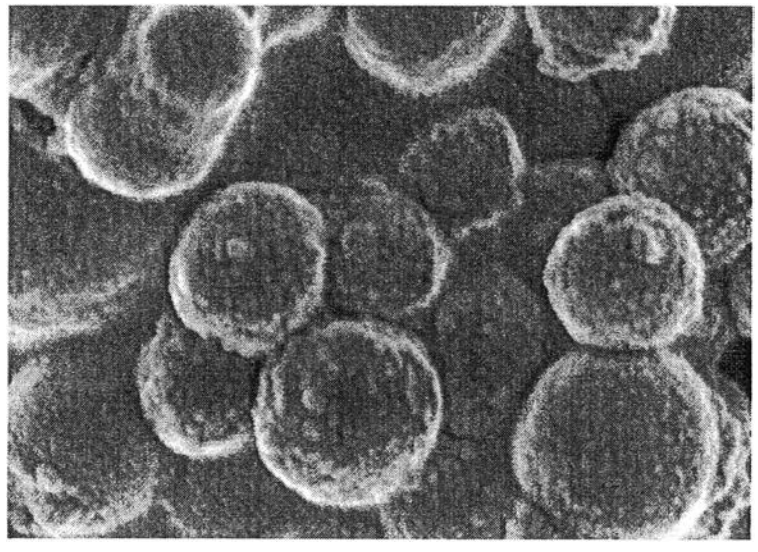

Figure A4 SEM of polyHIPE with SpanR80:Triton X-100 = 1.00 at magnifications of x100K.

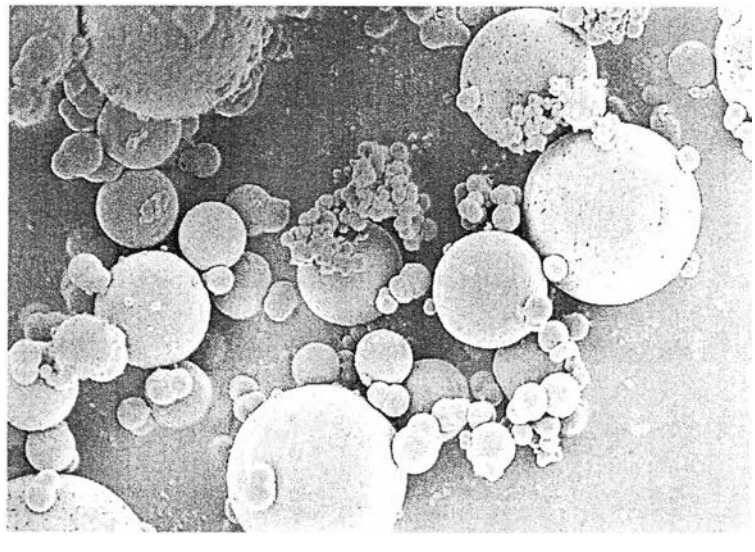

Figure A5 SEM of polyHIPE with SpanR80:Triton X-100 = 1.18 at magnifications of x10K.

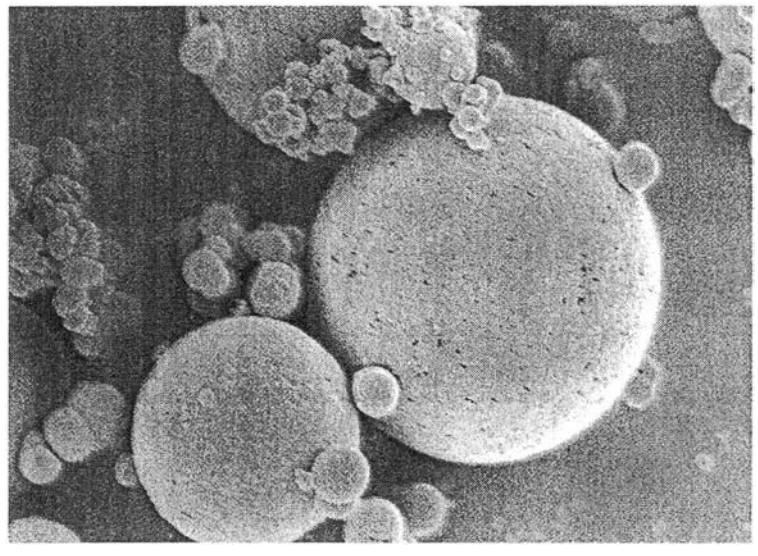

Figure A6 SEM of polyHIPE with SpanR80:Triton X-100 = 1.18 at magnifications of x20K.

Figure A7 SEM of polyHIPE with SpanR80:Triton X-100 = 1.18 at magnifications of x50K.

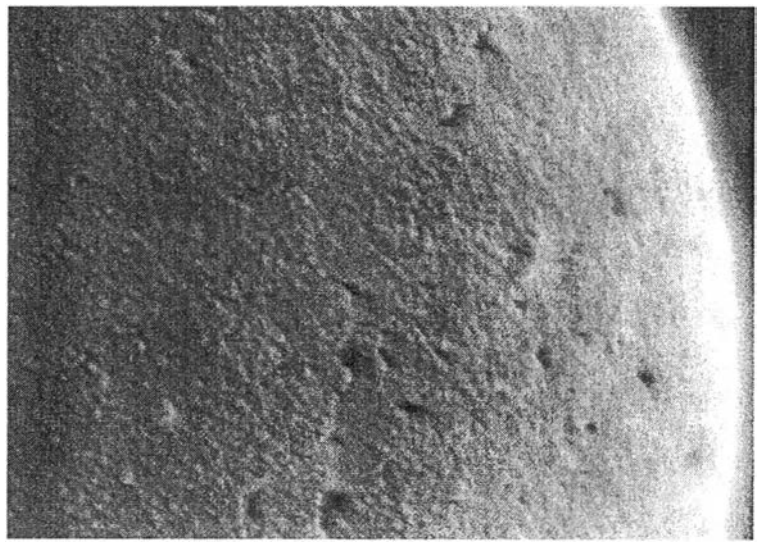

Figure A8 SEM of polyHIPE with SpanR80:Triton X-100 = 1.18 at magnifications of x100K.

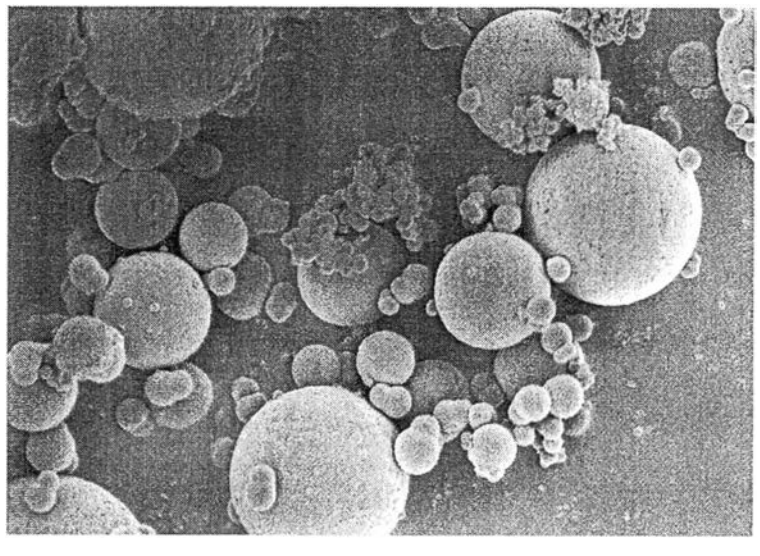

Figure A9 SEM of polyHIPE with SpanR80:Triton X-100 = 1.33 at magnifications of x10K.

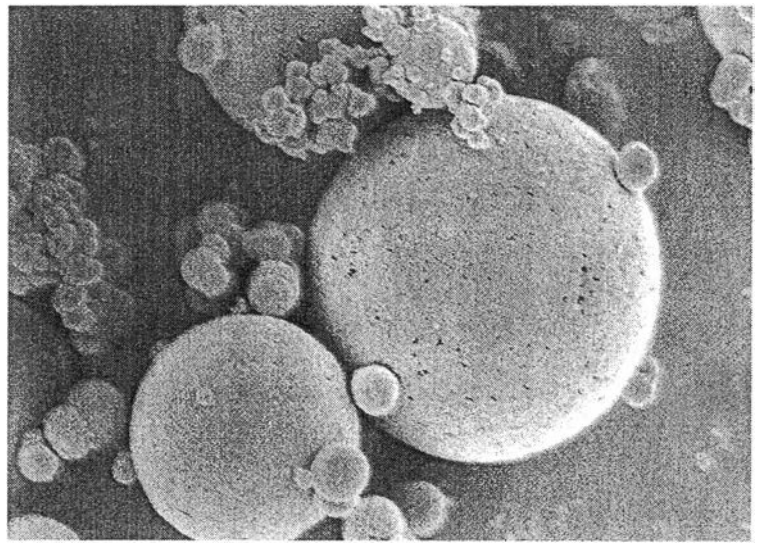

Figure A10 SEM of polyHIPE with SpanR80:Triton X-100 = 1.33 at magnifications of x20K

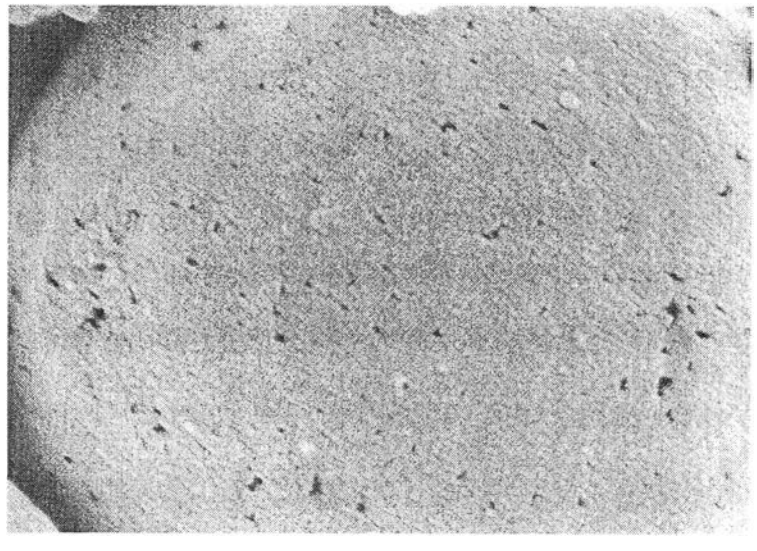

Figure A11 SEM of polyHIPE with SpanR80:Triton X-100 = 1.33 at magnifications of x50K.

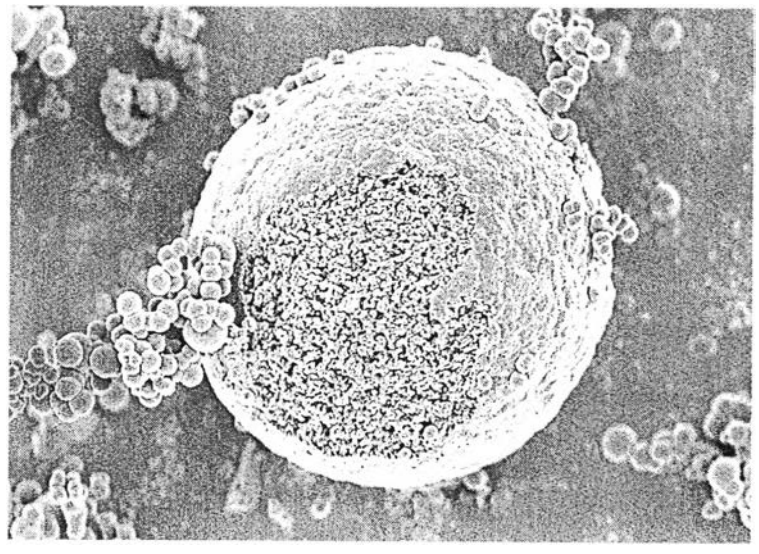

Figure A12 SEM of cracked surface of polyHIPE with SpanR80:Triton X-100 = 1.33 at magnifications of x10K.

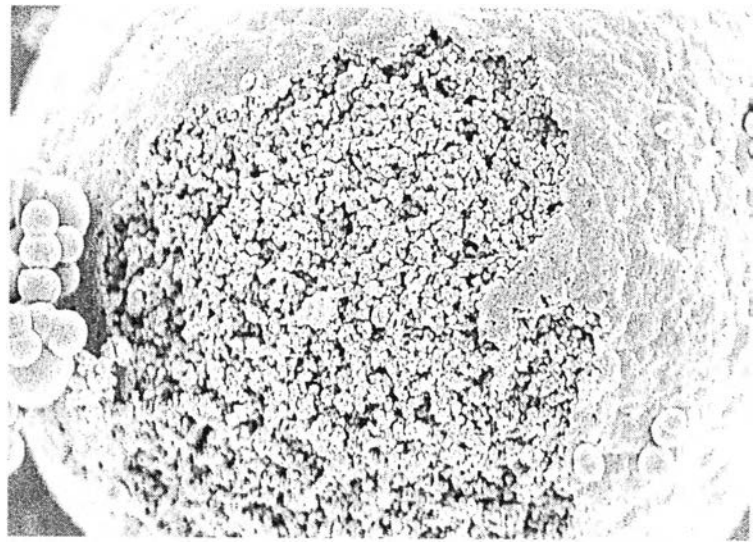

Figure A13 SEM of cracked surface of polyHIPE with SpanR80:Triton X-100 = 1.33 at magnifications of x20K.

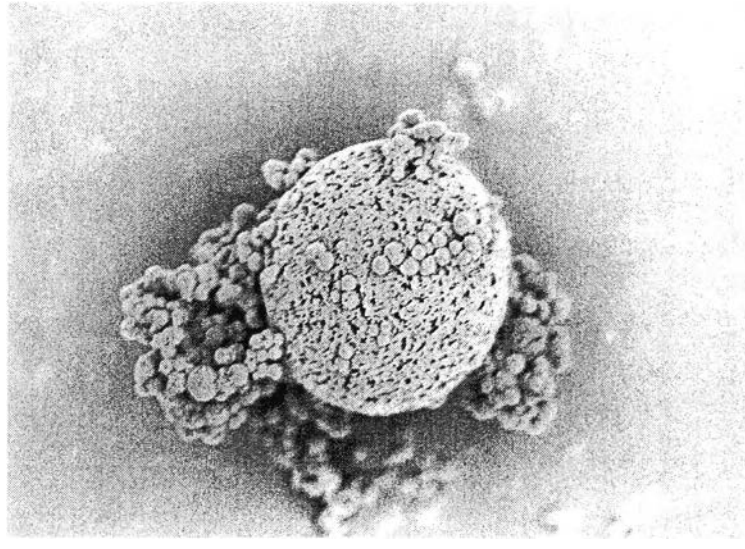

Figure A14 SEM of polyHIPE with SpanR80:Triton X-100 = 1.54 at magnifications of x10K

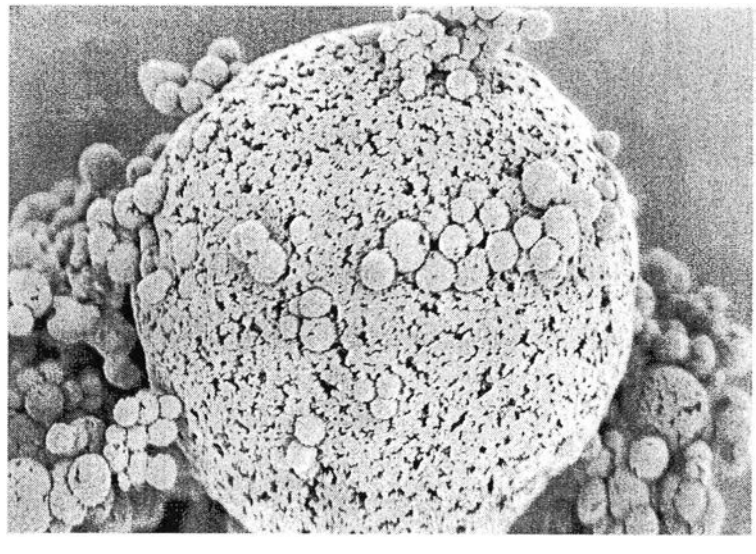

Figure A15 SEM of polyHIPE with SpanR80:Triton X-100 = 1.54 at magnifications of x20K.

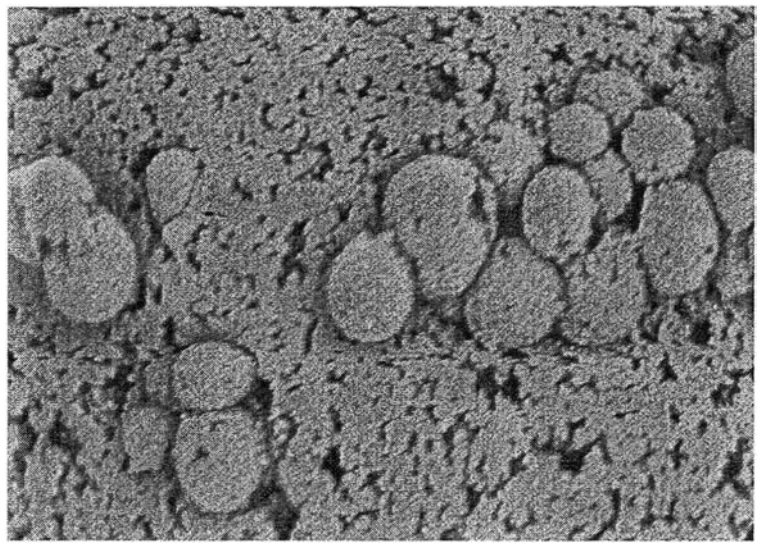

Figure A16 SEM of polyHIPE with SpanR80:Triton X-100 = 1.54 at magnifications of x50K.

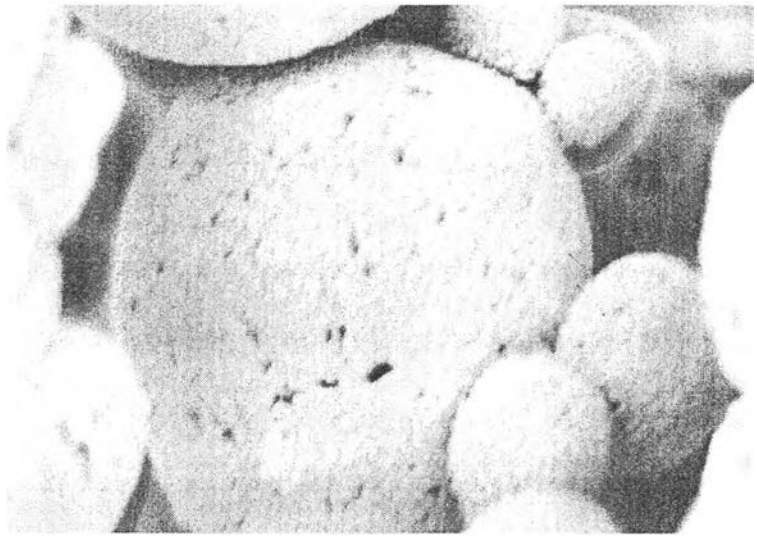

Figure A17 SEM of polyHIPE with SpanR80:Triton X-100 = 1.54 at magnifications of x100K.

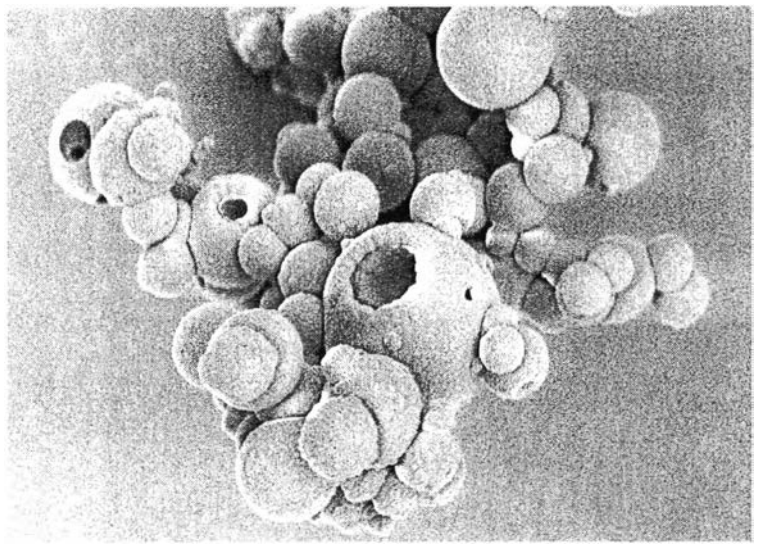

Figure A18 SEM of polyHIPE with SpanR80:Triton X-100 = 2 at magnifications of x10K.

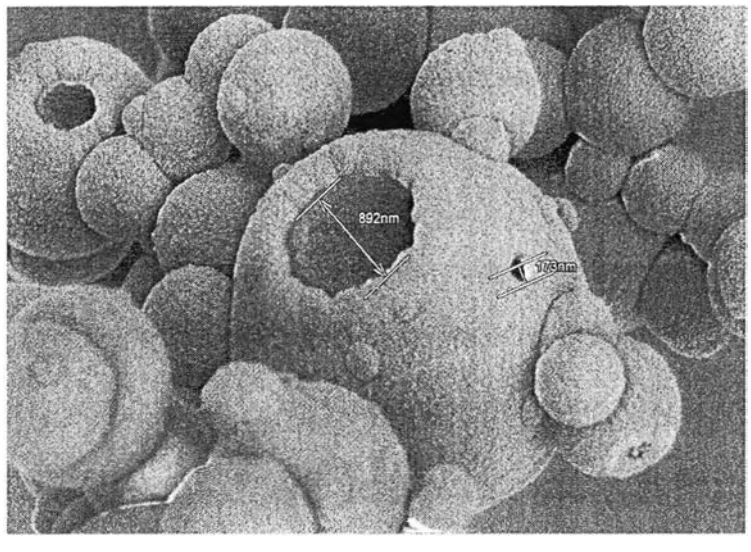

Figure A19 SEM of polyHIPE with SpanR80:Triton X-100 = 2 at magnifications of x20K

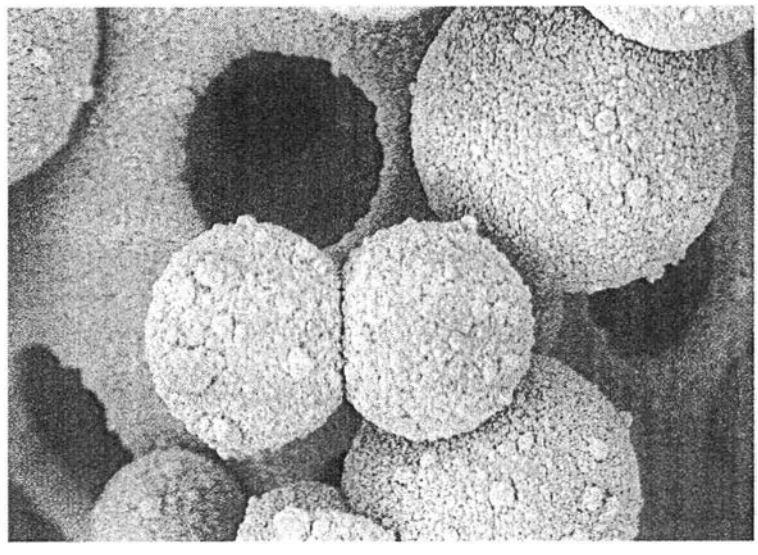

Figure A20 SEM of polyHIPE with SpanR80:Triton X-100 = 2 at magnifications of x50K

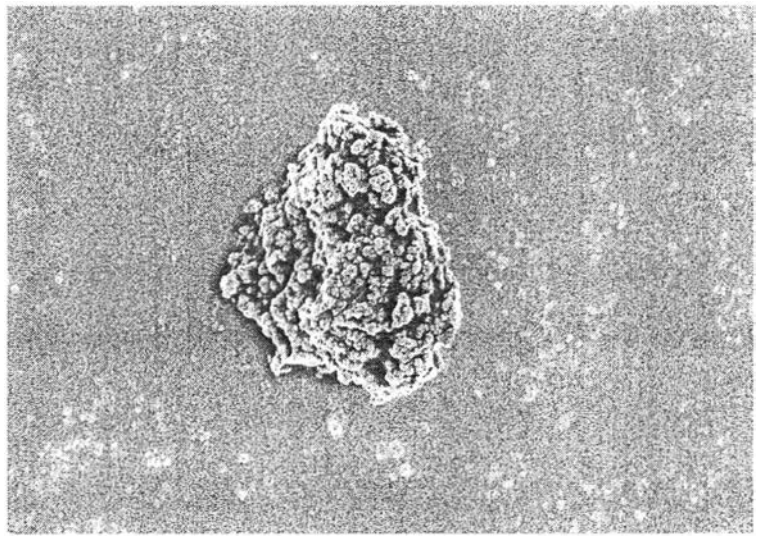

Figure A21 SEM of polyHIPE with SpanR80:Triton X-100 = 4 at magnifications of x10K.

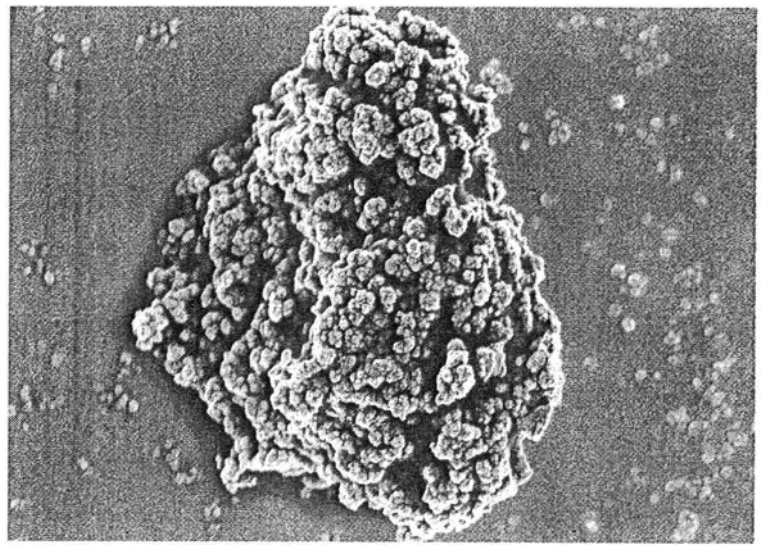

Figure A22 SEM of polyHIPE with SpanR80:Triton X-100 = 4 at magnifications of x20K.

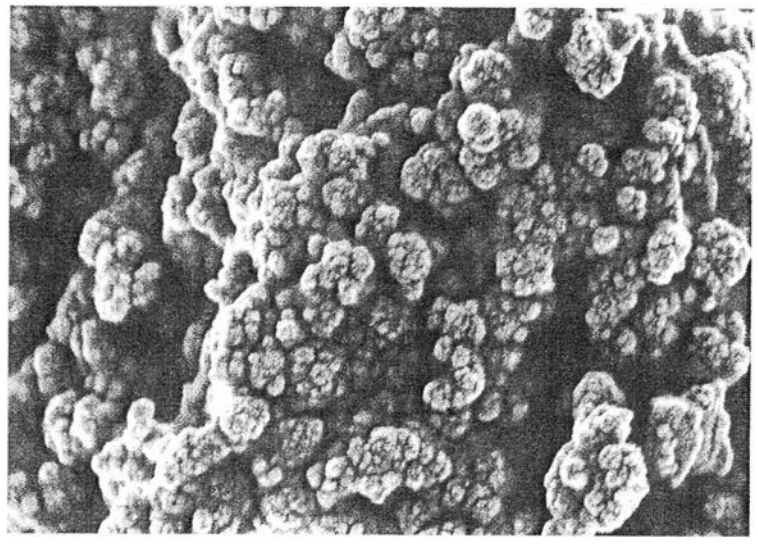

Figure A23 SEM of polyHIPE with SpanR80:Triton X-100 = 4 at magnifications of x50K.

A.3.2 PolyHIPE with 1,3-diaminopropane

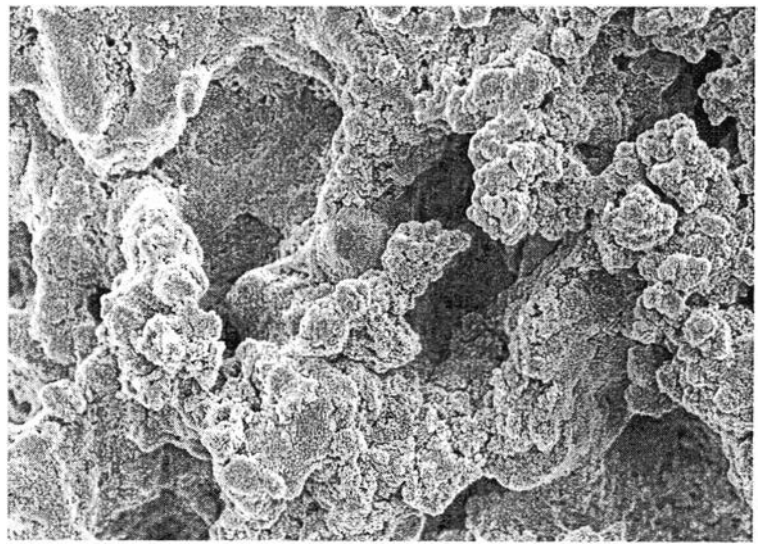

Figure A24 SEM of polyHIPE with hexylamine SpanR80:Triton X-100 = 0.73 at magnifications of x10K.

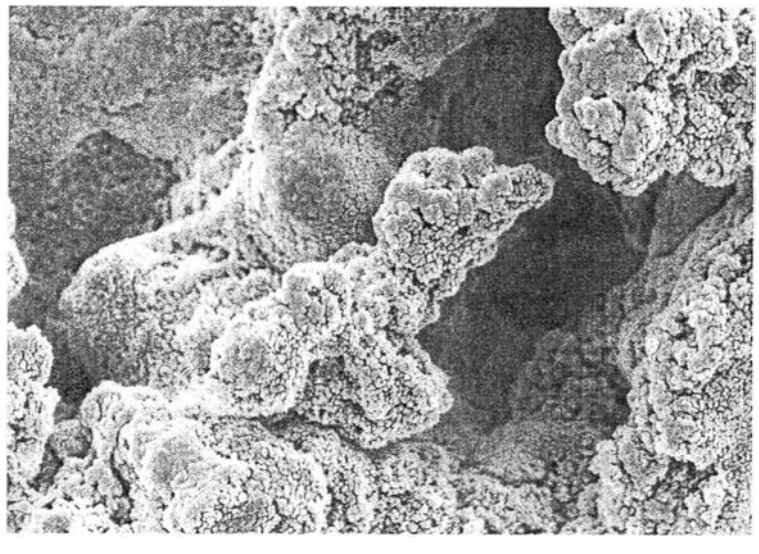

Figure A25 SEM of polyHIPE with hexylamine SpanR80:Triton X-100 = 0.73 at magnifications of x20K.

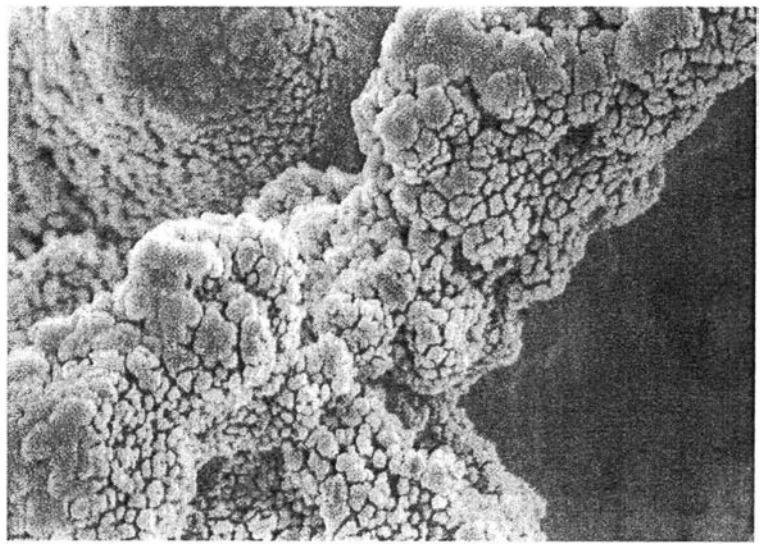

Figure A26 SEM of polyHIPE with hexylamine SpanR80:Triton X-100 = 0.73 at magnifications of x50K.

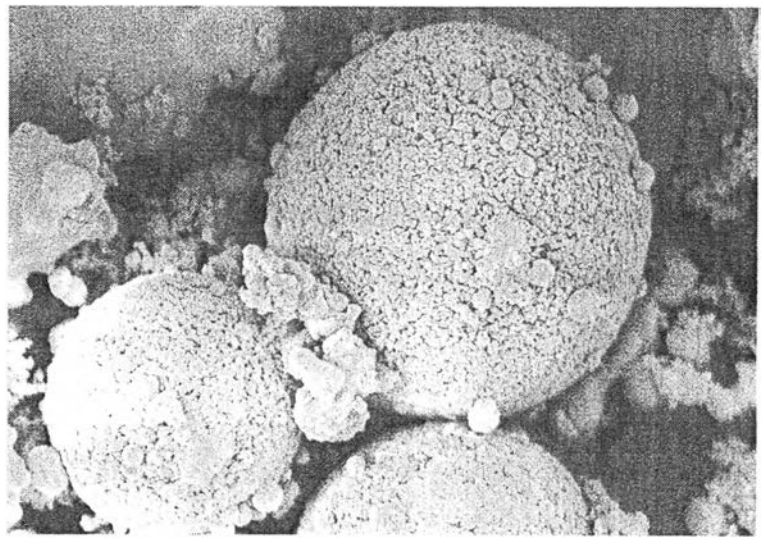

Figure A27 SEM of polyHIPE with hexylamine SpanR80:Triton X-100 = 1.33 at magnifications of x10K.

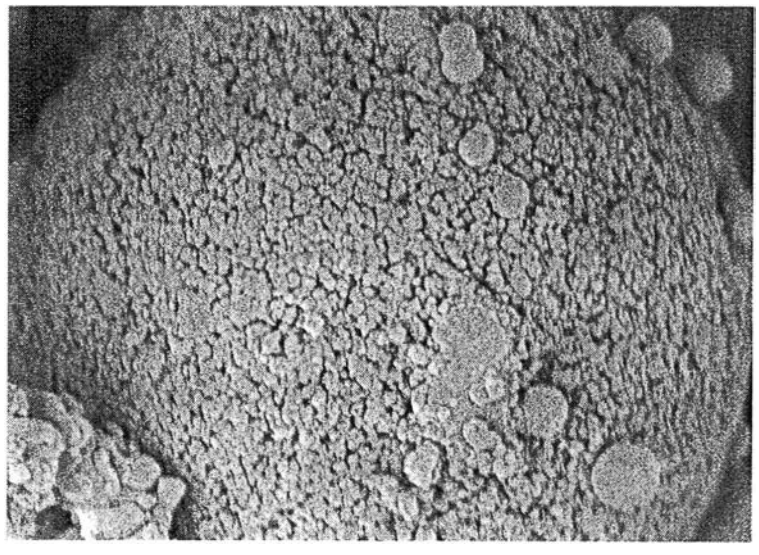

Figure A28 SEM of polyHIPE with hexylamine SpanR80:Triton X-100 = 1.33 at magnifications of x20K.

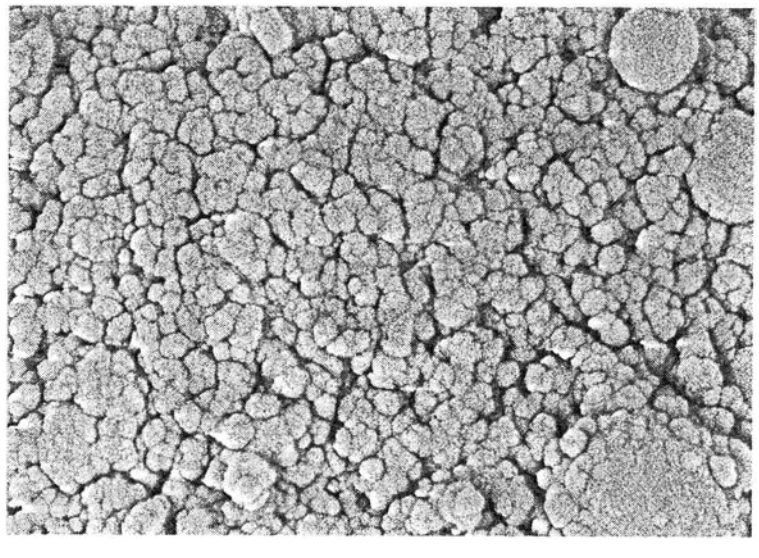

Figure A29 SEM of polyHIPE with hexylamine SpanR80:Triton X-100 = 1.33 at magnifications of x50K.

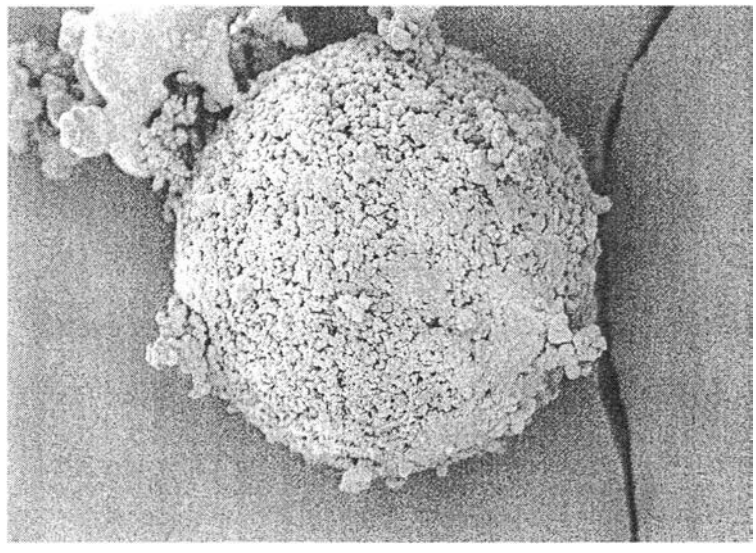

Figure A30 SEM of polyHIPE with hexylamine SpanR80:Triton X-100 = 1.50 at magnifications of x10K.

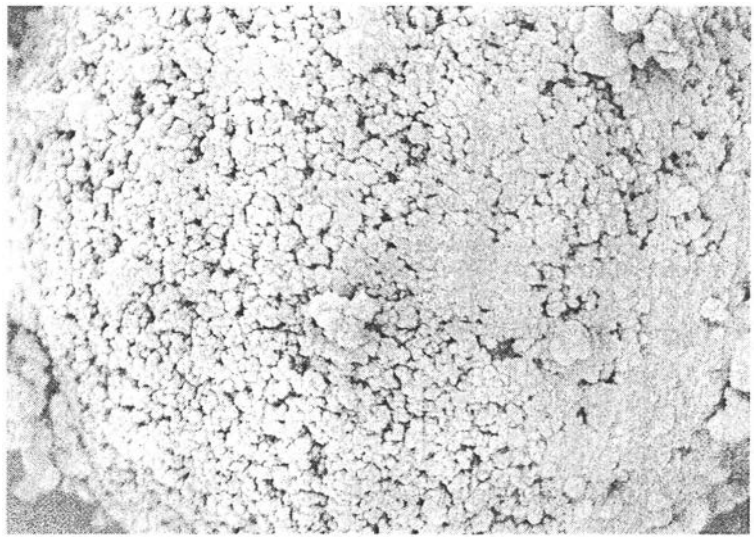

Figure A31 SEM of polyHIPE with hexylamine SpanR80:Triton X-100 = 1.50 at magnifications of x20K.

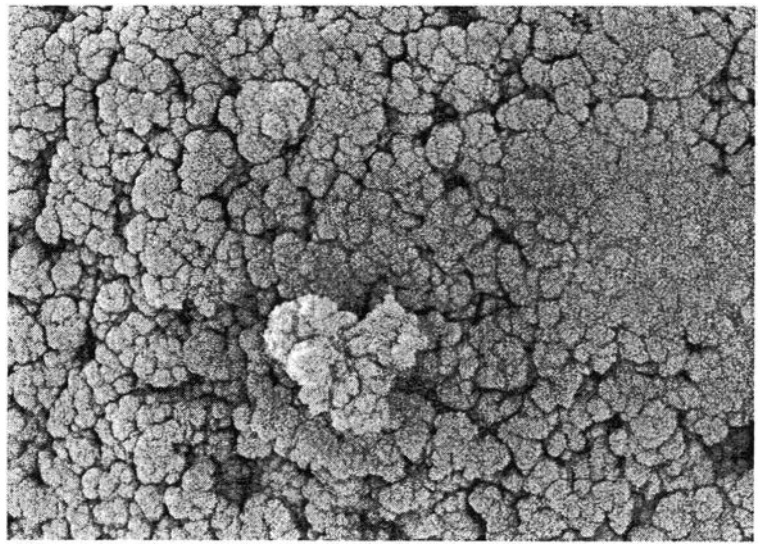

Figure A32 SEM of polyHIPE with hexylamine SpanR80:Triton X-100 = 1.50 at magnifications of x50K.

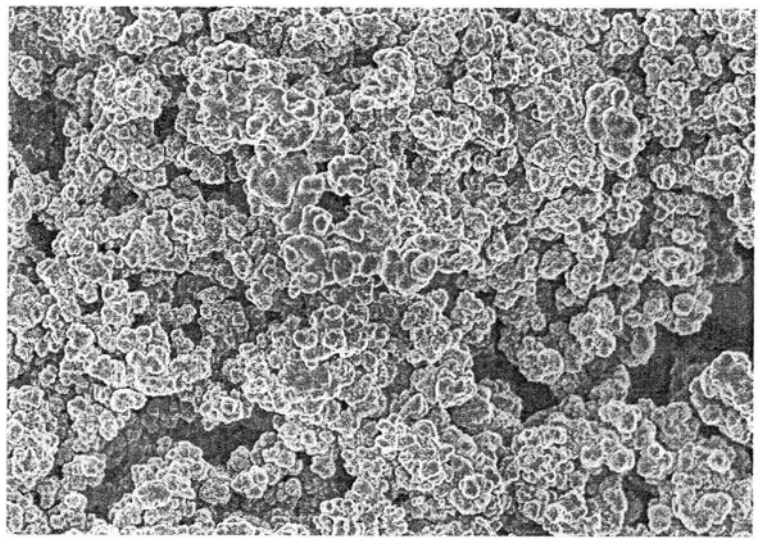

Figure A33 SEM of polyHIPE with hexylamine SpanR80:Triton X-100 = 1.71 at magnifications of x10K.

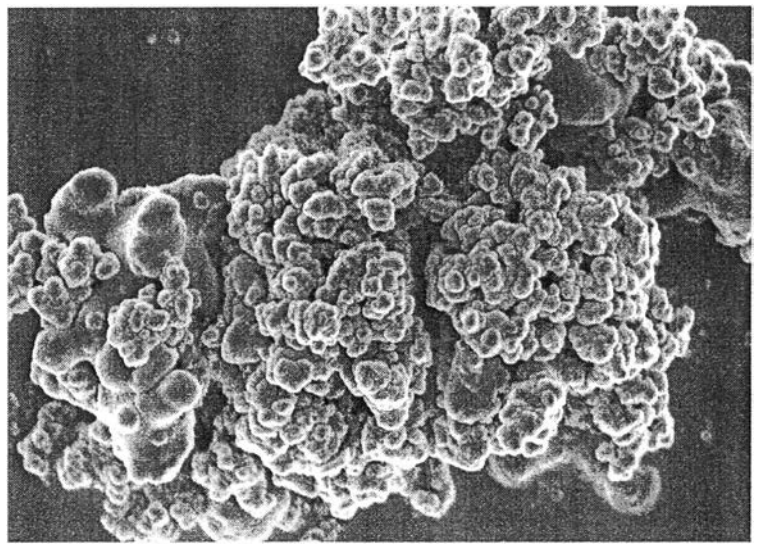

Figure A34 SEM of polyHIPE with hexylamine SpanR80:Triton X-100 = 1.71 at magnifications of x20K.

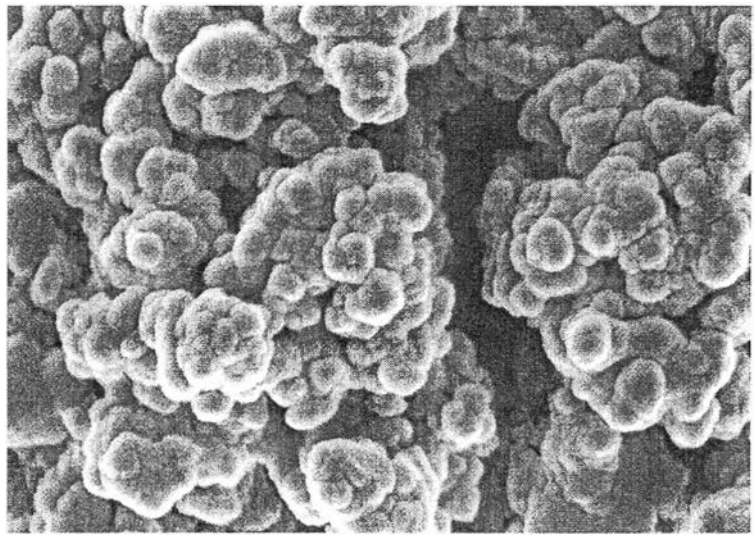

Figure A35 SEM of polyHIPE with hexylamine SpanR80:Triton X-100 = 1.71 at magnifications of x50K.

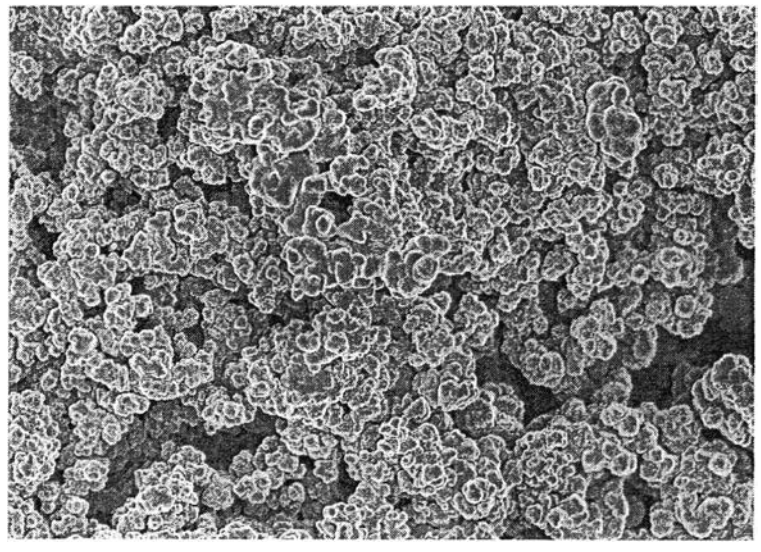

Figure A36 SEM of polyHIPE with 1,3-diaminopropane SpanR80:Triton X-100 = 0.72 at magnifications of x10K.

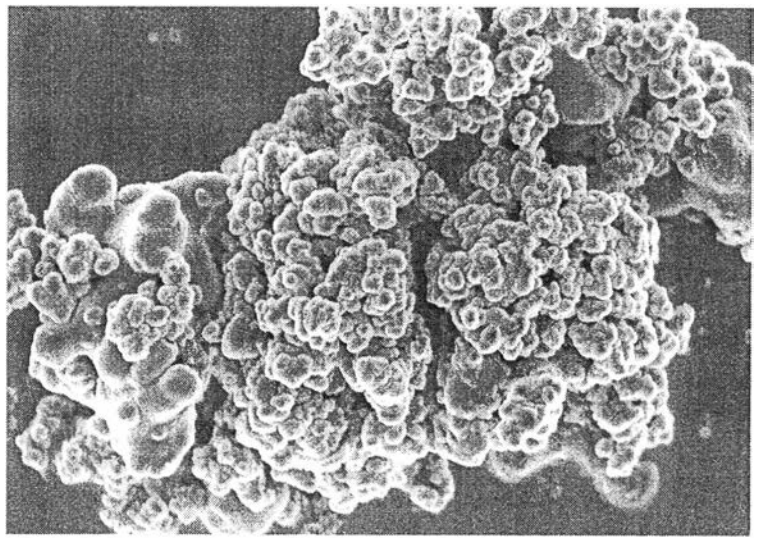

Figure A37 SEM of polyHIPE with 1,3-diaminopropane SpanR80:Triton X-100 = 0.72 at magnifications of x20K.

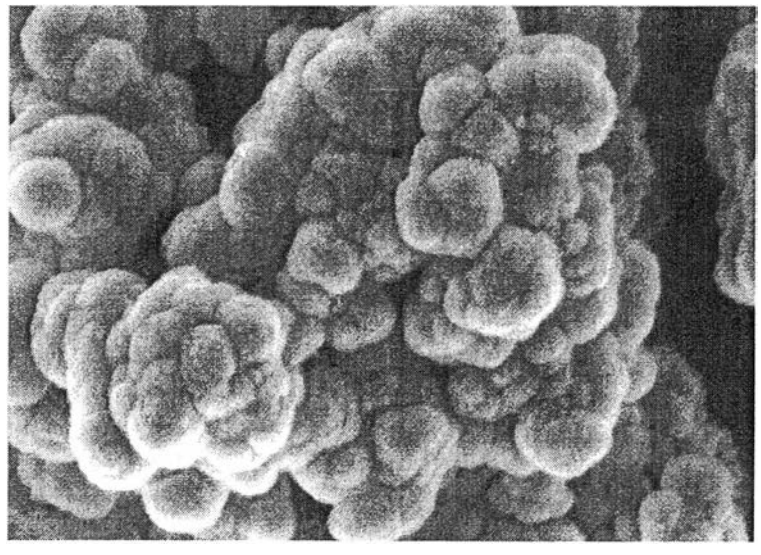

Figure A38 SEM of polyHIPE with 1,3-diaminopropane SpanR80:Triton X-100 = 0.72 at magnifications of x50K.

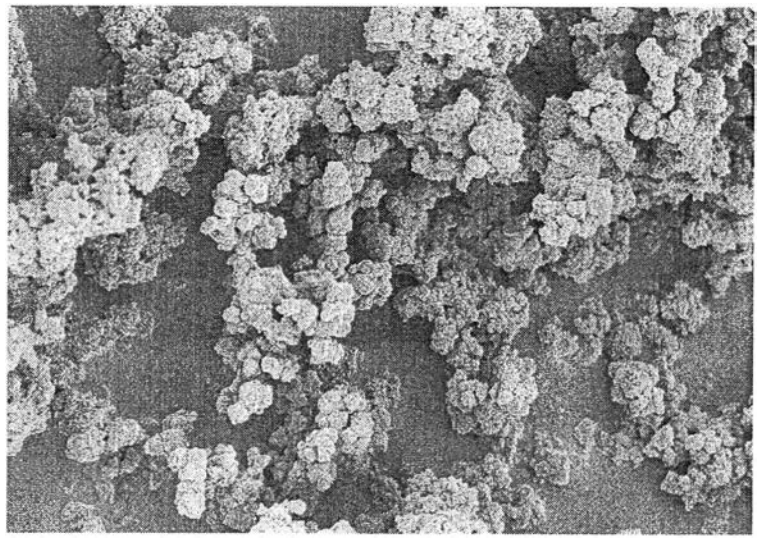

Figure A39 SEM of polyHIPE with 1,3-diaminopropane SpanR80:Triton X-100 = 0.76 at magnifications of x10K.

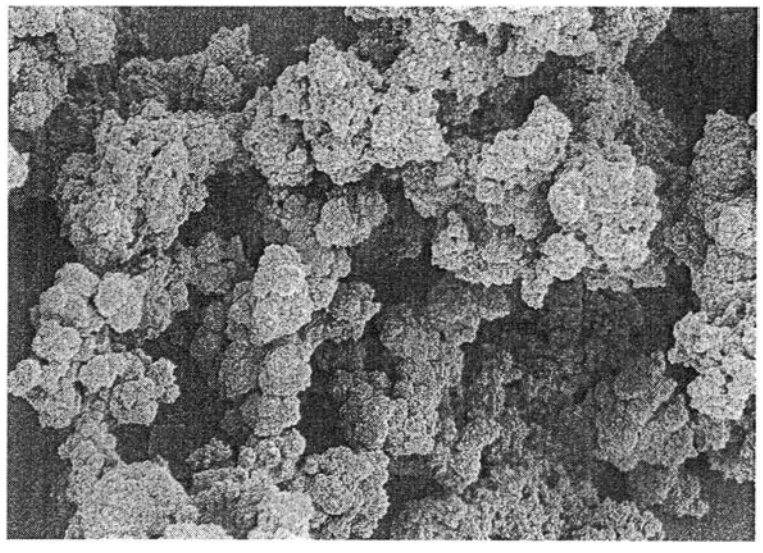

Figure A40 SEM of polyHIPE with 1,3-diaminopropane SpanR80:Triton X-100 = 0.76 at magnifications of x20K.

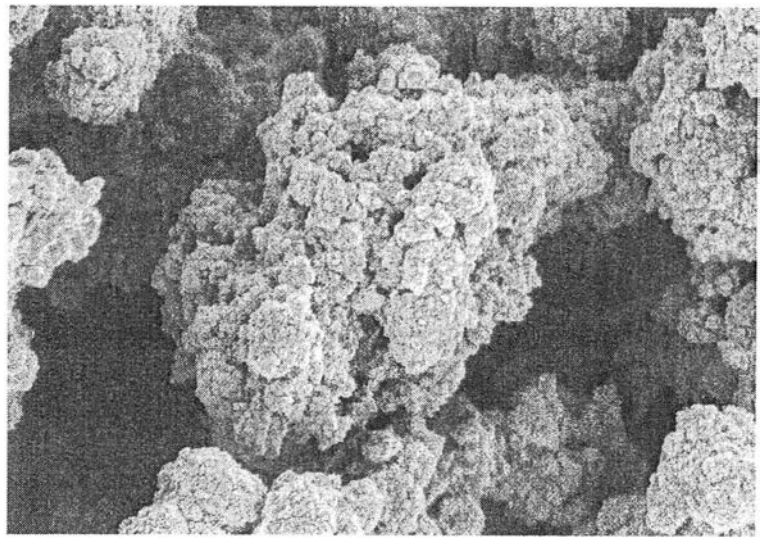

Figure A41 SEM of polyHIPE with 1,3-diaminopropane SpanR80:Triton X-100 = 0.76 at magnifications of x50K.

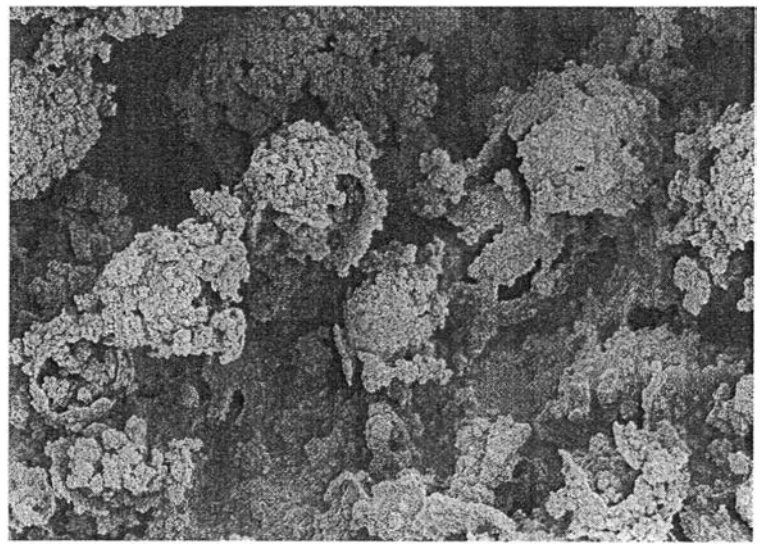

Figure A42 SEM of polyHIPE with 1,3-diaminopropane SpanR80:Triton X-100 = 0.81 at magnifications of x10K.

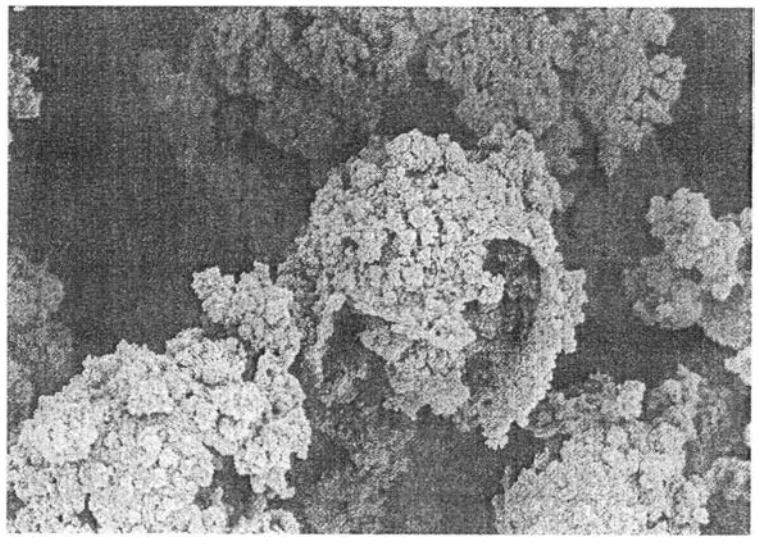

Figure A43 SEM of polyHIPE with 1,3-diaminopropane SpanR80:Triton X-100 = 0.81 at magnifications of x20K.

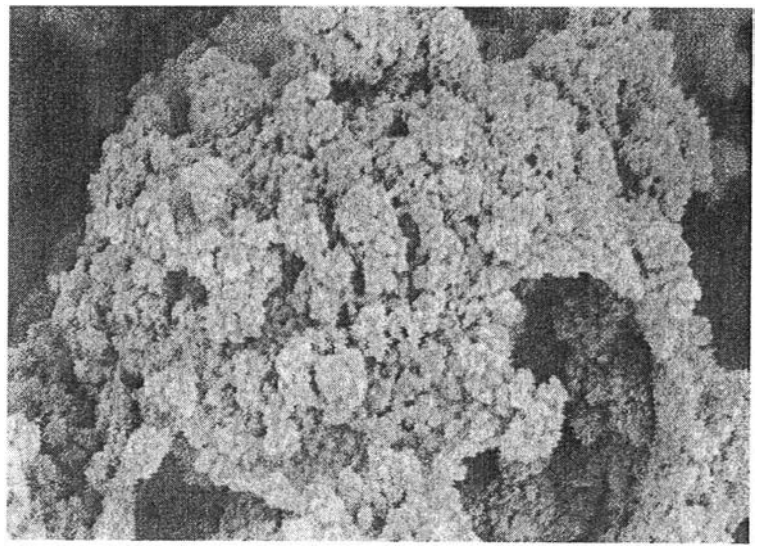

Figure A44 SEM of polyHIPE with 1,3-diaminopropane SpanR80:Triton X-100 = 0.81 at magnifications of x50K.

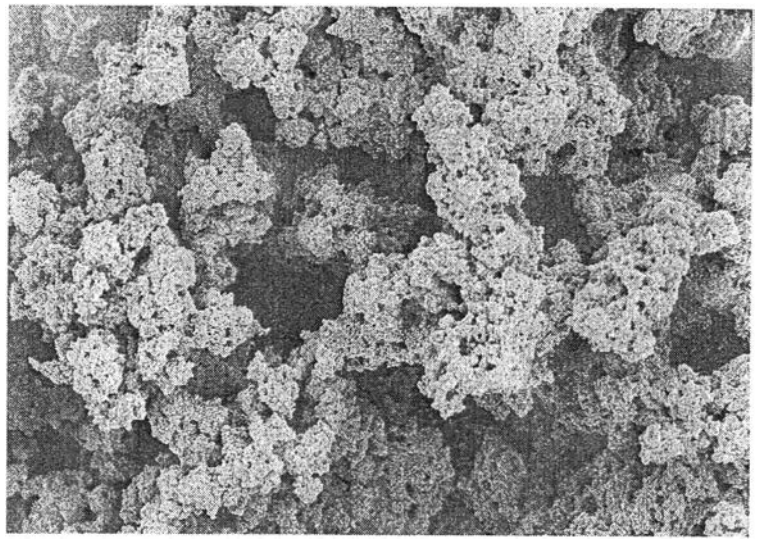

Figure A45 SEM of polyHIPE with 1,3-diaminopropane SpanR80:Triton X-100 = 0.87 at magnifications of x10K.

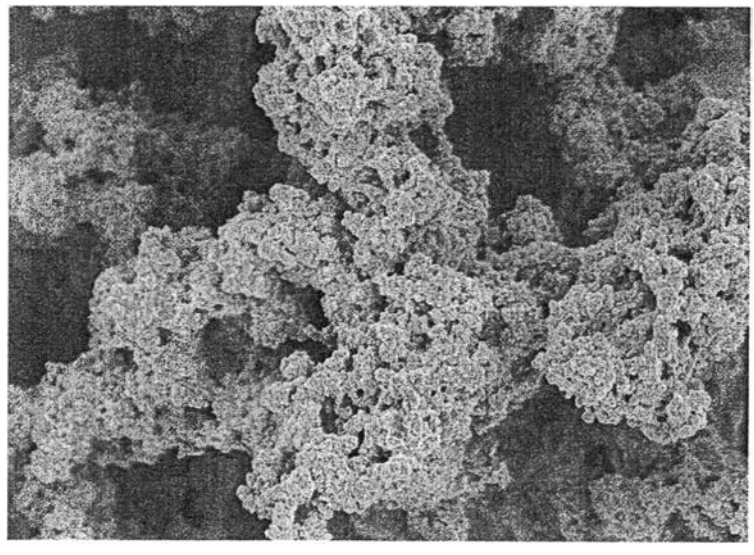

Figure A46 SEM of polyHIPE with 1,3-diaminopropane SpanR80:Triton X-100 = 0.87 at magnifications of x20K.

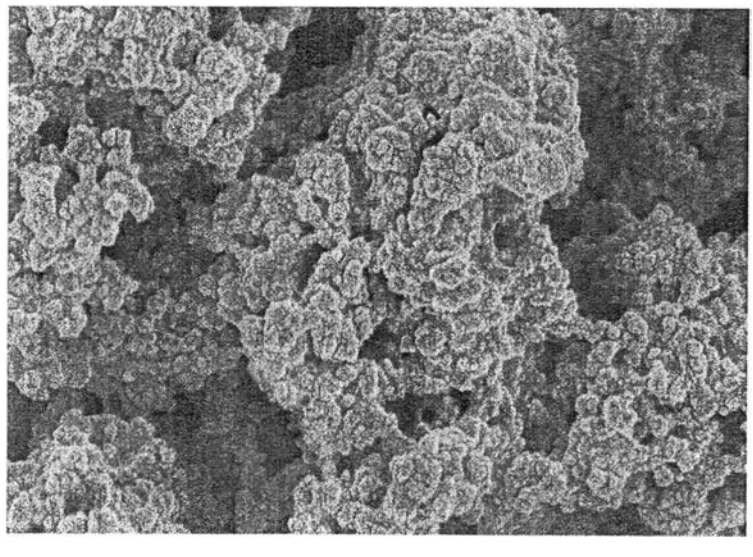

Figure A47 SEM of polyHIPE with 1,3-diaminopropane SpanR80:Triton X-100 = 0.87 at magnifications of x50K.

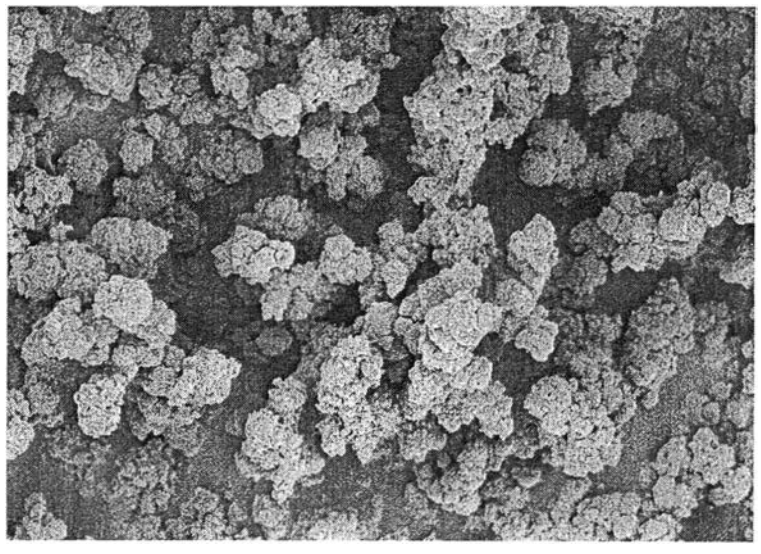

Figure A48 SEM of polyHIPE with 1,3-diaminopropane SpanR80:Triton X-100 = 0.93 at magnifications of x10K.

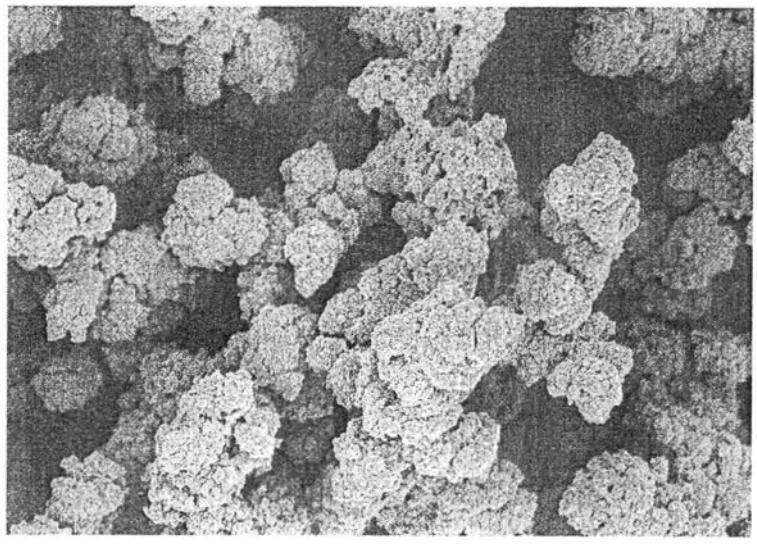

Figure A49 SEM of polyHIPE with 1,3-diaminopropane SpanR80:Triton X-100 = 0.93 at magnifications of x20K.

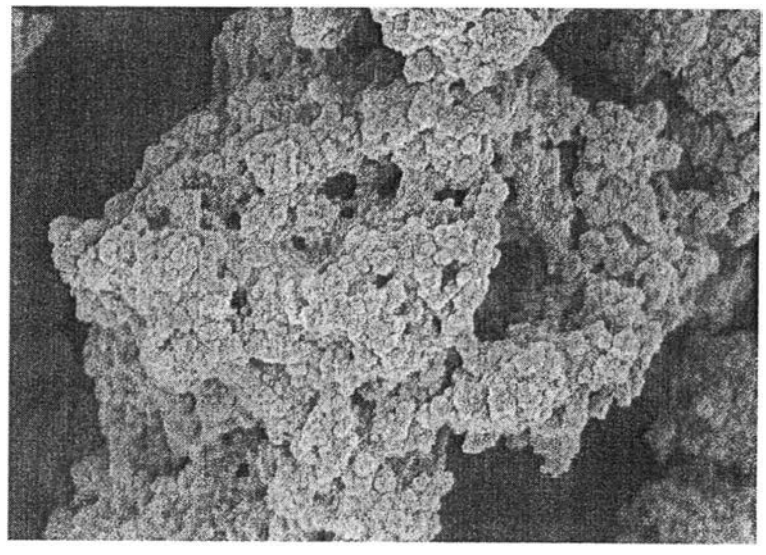

Figure A50 SEM of polyHIPE with 1,3-diaminopropane SpanR80:Triton X-100 = 0.93 at magnifications of x50K.

Appendix B Calculation of Quantity of Amines

The quantity of amines for the reaction with VBC were calculated by using mol ratio of amine to VBC equal 1.

TABLE B 1 Properties of VBC, hexylamine, 1,3-diaminopropane

	VBC	Hexylamine	1,3-diaminopropane
Molecular weight (g/mol)	152.62	101.2	74.12
Density (g/ml)	1.083	0.766	0.888

The mole ratio of VBC and amine was fixed at 1:1.07

VBC calculation

From $\textbf{mole} = \frac{\textbf{mass}}{\textbf{molecular weight}}$

$1 \text{ mol} = \frac{\text{mass}}{152.62 \text{ g/mol}}$

$\text{mass} = 152.62 \text{ g}$

From $\textbf{density} = \frac{mass}{volume}$

$1.083 \text{ g/ml} = \frac{152.62 \text{ g}}{volume}$

$volume = \frac{152.62\ g}{1.083\ g/ml}$

$volume = 140.92\ ml$

Thus VBC 1 mole is 140.92 ml

Hexylamine calculation

From $\textbf{mole} = \frac{\textbf{mass}}{\textbf{molecular weight}}$

$1.07 \text{ mol} = \frac{\text{mass}}{101.2 \text{ g/mol}}$

$\text{mass} = 108.28 \text{ g}$

From $\textbf{density} = \frac{mass}{volume}$

$0.766 \text{ g/ml} = \frac{108.28 \text{ g}}{volume}$

$$volume = \frac{108.28\ g}{0.766\ g/ml}$$

$$volume = 141.36ml$$

thus the volume ratio between VBC and hexylamine is 140.92: 141.36 or 2.00:2.00

1,3-diaminopropne calculation

From $$\textbf{mole} = \frac{\textbf{mass}}{\textbf{molecular weight}}$$

$$1.07\ \text{mol} = \frac{\text{mass}}{74.12\ \text{g/mol}}$$

$$\text{mass} = 79.308\ \text{g}$$

From $$\textbf{density} = \frac{mass}{volume}$$

$$0.888\ \text{g/ml} = \frac{79.308\ \text{g}}{volume}$$

$$volume = \frac{79.308\ g}{0.888\ g/ml}$$

$$volume = 89.311ml$$

thus the volume ratio between VBC and hexylamine is 140.92: 89.311 or 1:1.26

Appendix C Calculation of %Conversion of Reaction between Amines and VBC by FTIR Spectra

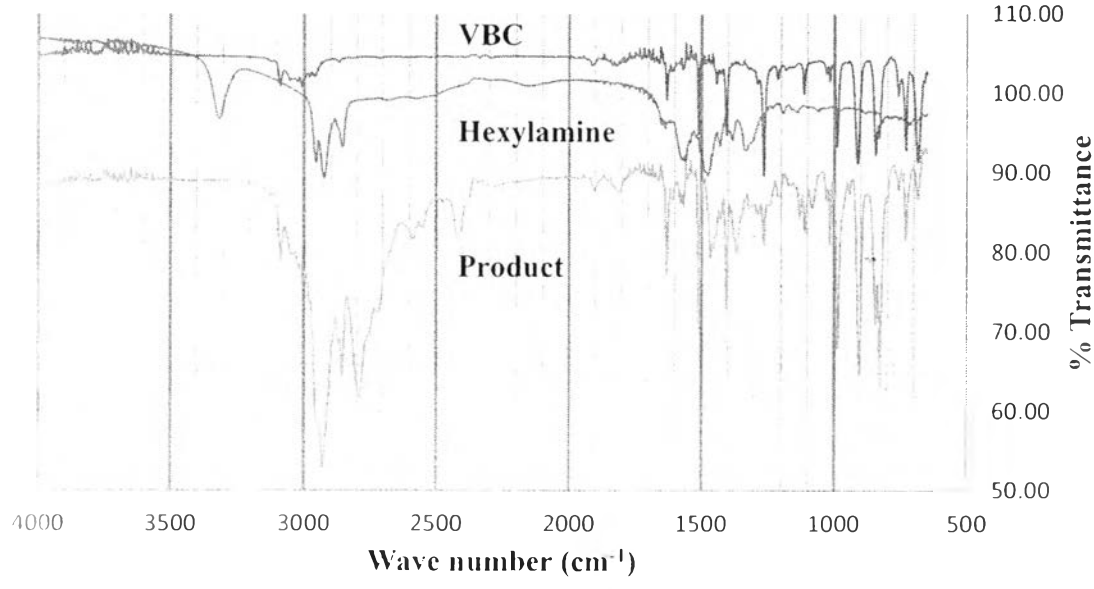

Figure C1 FTIR spectra of hexylamine, VBC and VBC reacted with hexylamine.

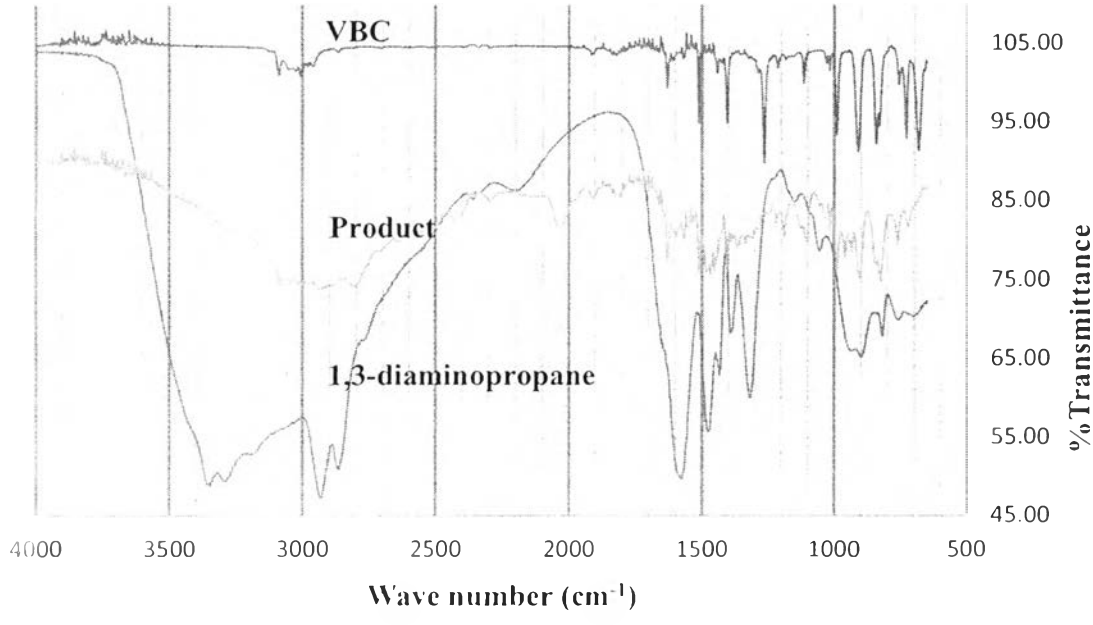

Figure C2 FTIR spectra of 1,3-diaminopropane, VBC and VBC reacted with 1,3-diaminopropane.

Appendix D CO_2 Adsorption

PolyHIPEs reference (recipe 2)

Weight of polyHIPE: 0.2579 g

Flow rate: 3.10 ml/min

TABLE D1 CO_2 adsorption data of polyHIPEs reference (recipe 2)

Time (min)	Area of CO_2	Retention time (min)	%CO_2 Concentration (C)	C/C_0
0	0	0	0.2517	0.0594
3	11.57	1.30	3.1152	0.7345
6	15.63	1.30	4.1200	0.9714
9	15.69	1.30	4.1348	0.9749
12	16.10	1.25	4.2363	0.9988
15	15.72	1.32	4.1422	0.9766
18	15.60	1.32	4.1125	0.9697
21	16.07	1.32	4.2288	0.9971
24	15.77	1.32	4.1546	0.9796
27	16.12	1.32	4.2412	1.0000
30	15.62	1.28	4.1175	0.9708

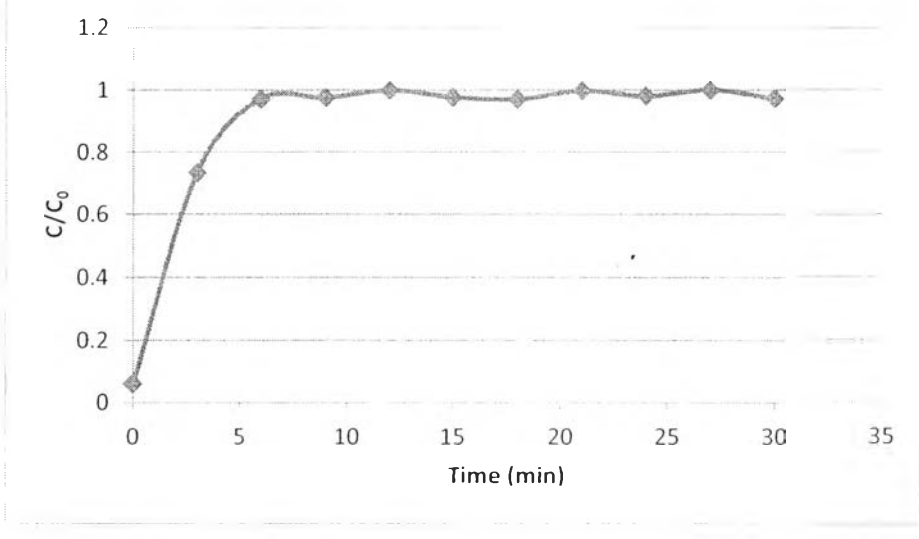

Figure D1 Break through curve of polyHIPE reference surfactant ratio 1.18 (recipe 2).

PolyHIPE with hexylamine (recipe 7)

Weight of polyHIPE: 0.2376 g, flow rate: 3.08 ml/min

Table D 2 CO_2 adsorption data of polyHIPE with hexylamine (recipe 7)

Time (min)	Area of CO_2	Retention time (min)	% CO_2 Concentration (C)	C/C_0
0	0	0	0.2517	0.0576
3	14.04	1.32	3.7264	0.8532
6	16.57	1.32	4.3526	0.9966
9	16.63	1.28	4.3674	1.0000
12	16.59	1.32	4.3575	0.9977

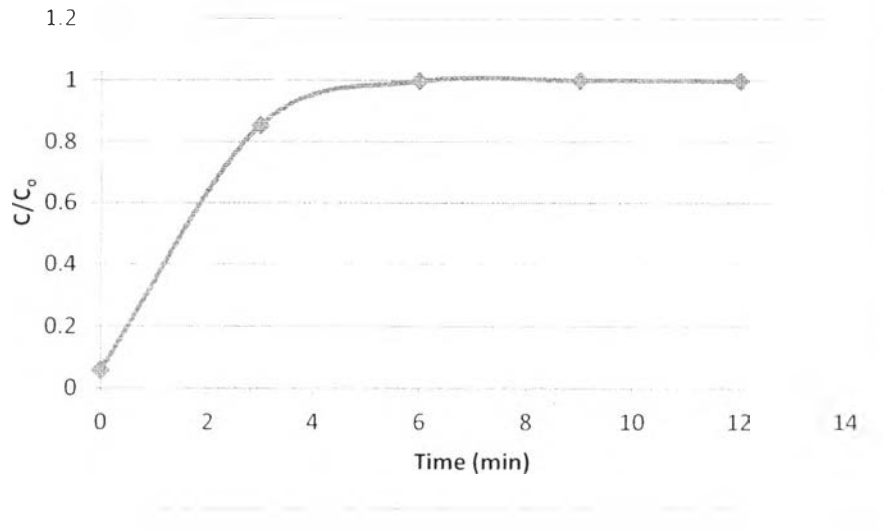

Figure D2 Break through curve of polyHIPE with hexylamine, surfactant ratio 1.20 (recipe 7).

PolyHIPEs with hexylamine (recipe 8)

Weight of polyHIPE: 0.2705 g, flow rate: 3.01 ml/min

TABLE D 3 CO_2 adsorption data of polyHIPE with hexylamine (recipe 8)

Time (min)	Area of CO_2	Retention time (min)	$\%CO_2$ Concentration (C)	C/C_0
0	0	0	0.2517	0.0571
3	11.55	1.33	3.1102	0.7057
6	16.46	1.27	4.3254	0.9815
9	16.68	1.32	4.3798	0.9938
12	16.55	1.33	4.3476	0.9865
15	16.46	1.33	4.3254	0.9815
18	16.79	1.32	4.4070	1.0000

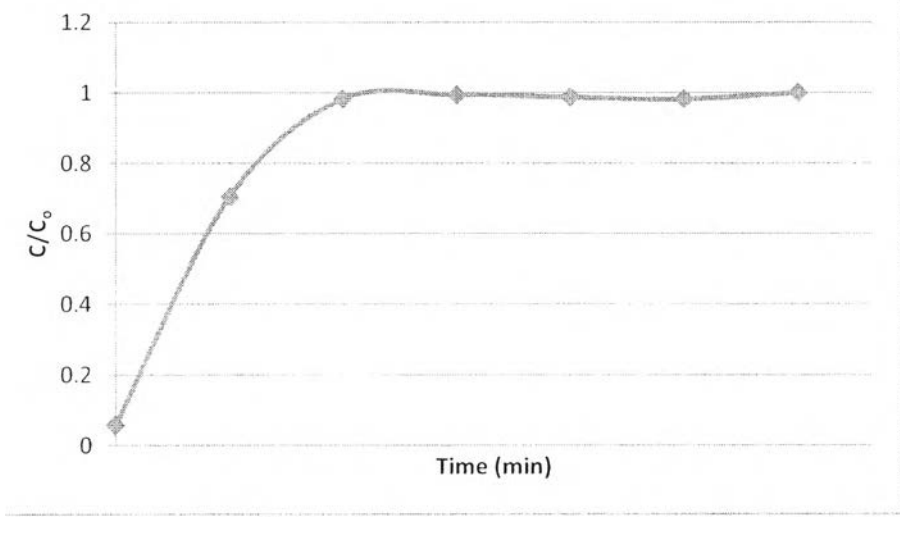

Figure D3 Break through curve of polyHIPE with hexylamine, surfactant ratio 1.33 (recipe 8).

PolyHIPEs with hexylamine (recipe 9)

Weight of polyHIPE: 0.2789 g, flow rate: 3.01 ml/min

TABLE D 4 CO_2 adsorption data of polyHIPE with hexylamine (recipe 9)

Time (min)	Area of CO_2	Retention time (min)	$\%CO_2$ Concentration (C)	C/C_0
0	0	0	0.2517	0.0595
3	6.95	1.32	1.9718	0.4663
6	15.74	1.32	4.1472	0.9807
9	15.90	1.27	4.1868	0.9901
12	15.84	1.30	4.1719	0.9865
15	15.89	1.32	4.1843	0.9895
18	15.95	1.32	4.1991	0.9930
21	15.69	1.30	4.1348	0.9778
24	16.04	1.30	4.2214	0.9982
27	15.90	1.28	4.1868	0.9900
30	15.84	1.30	4.1719	0.9865
33	15.55	1.30	4.1002	0.9696
36	16.07	1.30	4.2288	1.0000
39	15.79	1.32	4.1596	0.9836
42	15.77	1.30	4.1546	0.9824

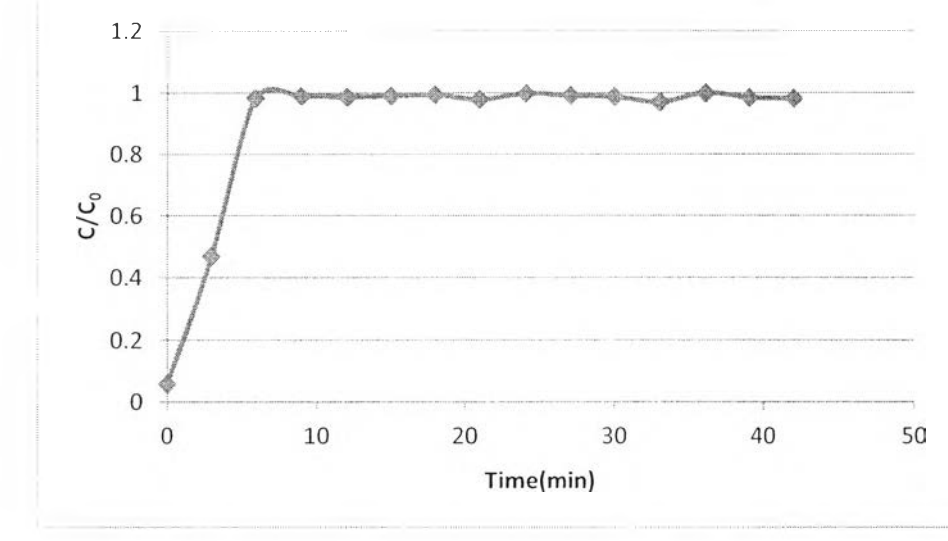

Figure D4 Break through curve of polyHIPE with hexylamine, surfactant ratio 1.50 (recipe 9).

PolyHIPEs with hexylamine (recipe 10)

Weight of polyHIPE: 0.2849 g, flow rate: 3.02 ml/min

TABLE D 5 CO_2 adsorption data of polyHIPE with hexylamine (recipe 10)

Time (min)	Area of CO_2	Retention time (min)	$\%CO_2$ Concentration (C)	C/C_0
0	0	0	0.2517	0.0572
3	8.63	1.32	2.3875	0.5424
6	16.49	1.32	4.3328	0.9843
9	16.62	1.27	4.3650	0.9916
12	16.60	1.30	4.3600	0.9904
15	16.65	1.32	4.3724	0.9932
18	16.62	1.32	4.3650	0.9916
21	16.77	1.32	4.4021	1.0000

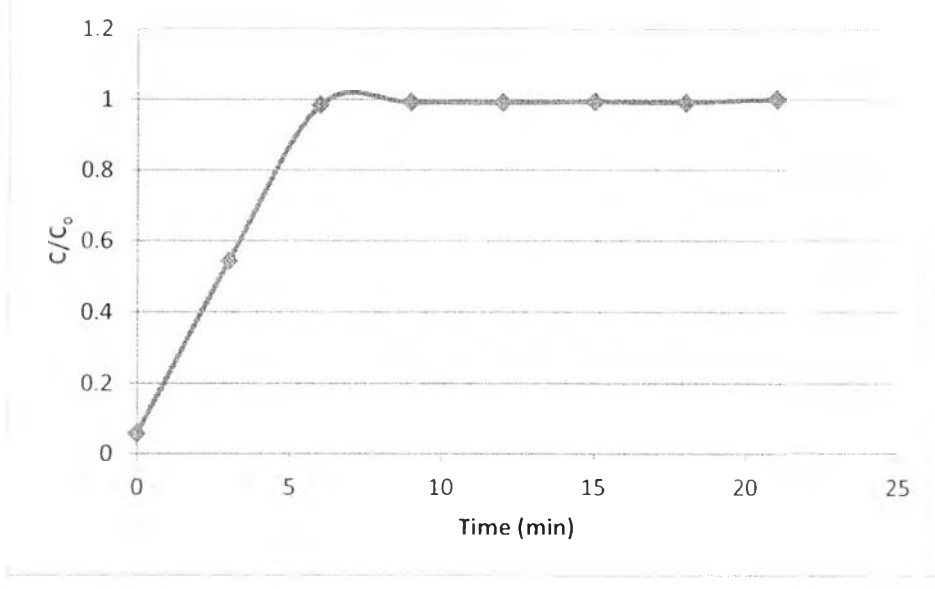

Figure D5 Break through curve of polyHIPE with hexylamine, surfactant ratio 1.71 (recipe 10).

PolyHIPEs with 1,3-diaminopropane (recipe 11)

Weight of polyHIPE: 0.0483 g, flow rate: 3.04 ml/min

TABLE D 6 CO_2 adsorption data of polyHIPE with 1,3-diaminopropane (recipe 11)

Time (min)	Area of CO_2	Retention time (min)	$\%CO_2$ Concentration (C)	C/C_0
0	0	0	0.2517	0.0577
3	8.24	1.28	2.2910	0.5252
6	16.38	1.27	4.3056	0.9869
9	15.85	1.27	4.1744	0.9569
12	16.41	1.27	4.3130	0.9886
15	16.09	1.27	4.2338	0.9705
18	16.27	1.27	4.2783	0.9807
21	16.39	1.27	4.3080	0.9875
24	16.32	1.27	4.2907	0.9835
27	16.61	1.28	4.3625	1.0000
30	16.04	1.27	4.2214	0.9677

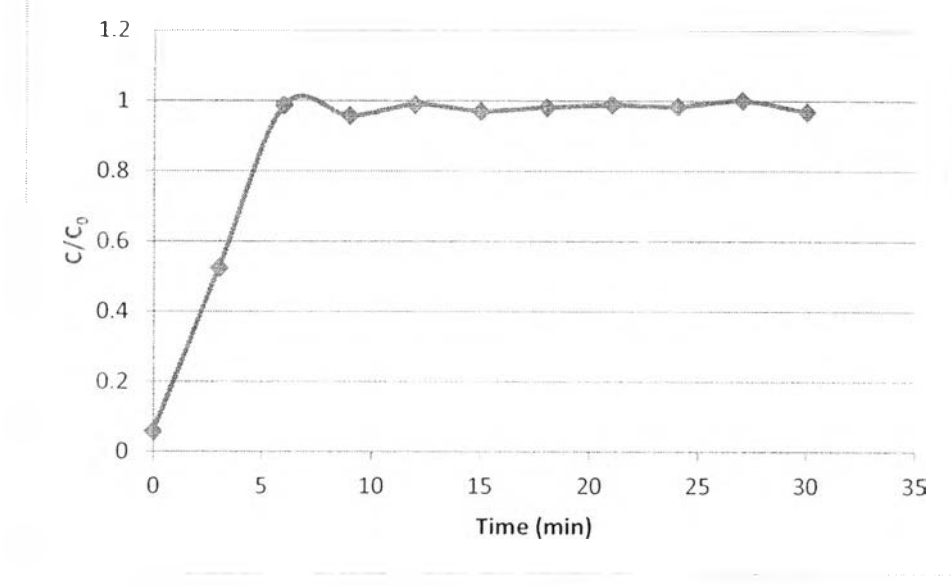

Figure D6 Break through curve of polyHIPE with hexylamine, surfactant ratio 0.72 (recipe 11).

PolyHIPEs with 1,3-diaminopropane (recipe 12)

Weight of polyHIPE: 0.0786 g, flow rate: 3.08 ml/min

TABLE D 7 CO_2 adsorption data of polyHIPE with 1,3-diaminopropane (recipe 12)

Time (min)	Area of CO_2	Retention time (min)	$\%CO_2$ Concentration (C)	C/C_0
0	0	0	0.2517	0.0582
3	7.84	1.28	2.1920	0.5065
6	16.01	1.27	4.2140	0.9737
9	15.99	1.27	4.2091	0.9725
12	15.89	1.27	4.1843	0.9668
15	15.68	1.27	4.1323	0.9548
18	16.23	1.27	4.2685	0.9863
21	16.47	1.27	4.3278	1.0000
24	16.15	1.27	4.2487	0.9817
27	15.97	1.28	4.2041	0.9714

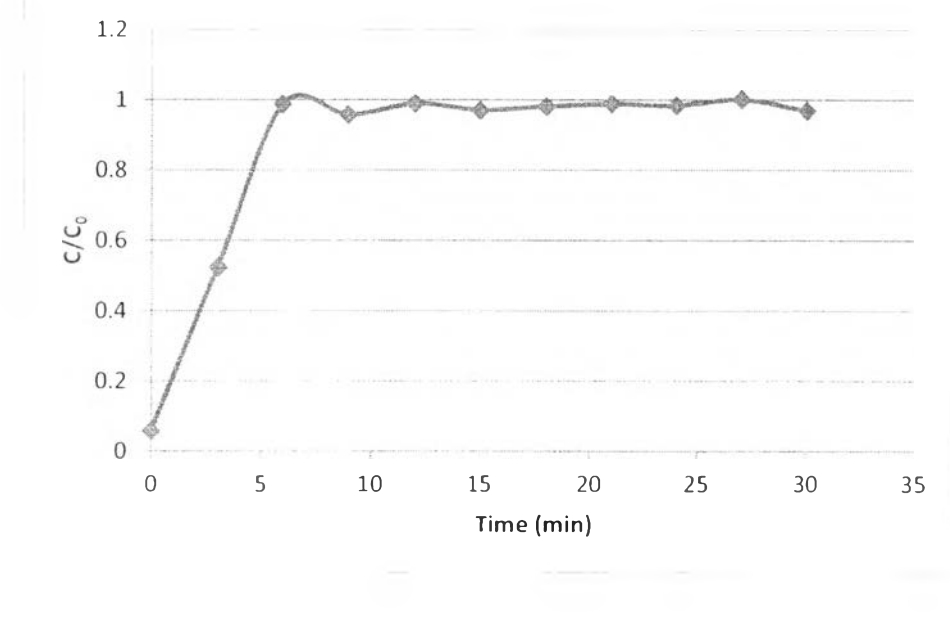

Figure D7 Break through curve of polyHIPE with hexylamine, surfactant ratio 0.76 (recipe 12).

PolyHIPEs with 1,3-diaminopropane (recipe 13)

Weight of polyHIPE: 0.0673 g, flow rate: 3.08 ml/min

TABLE D 8 CO_2 adsorption data of polyHIPE with 1,3-diaminopropane (recipe 13)

Time (min)	Area of CO_2	Retention time (min)	$\%CO_2$ Concentration (C)	C/C_0
0	0	0	0.2517	0.0571
3	11.64	1.28	3.1325	0.7108
6	16.24	1.28	4.2709	0.9691
9	16.32	1.28	4.2907	0.9736
12	16.37	1.27	4.3031	0.9764
15	16.65	1.27	4.3724	0.9921
18	16.79	1.27	4.4070	1.0000
21	16.60	1.27	4.3600	0.9893
24	16.58	1.27	4.3551	0.9882
27	16.44	1.27	4.3204	0.9803
30	16.53	1.25	4.3427	0.9854

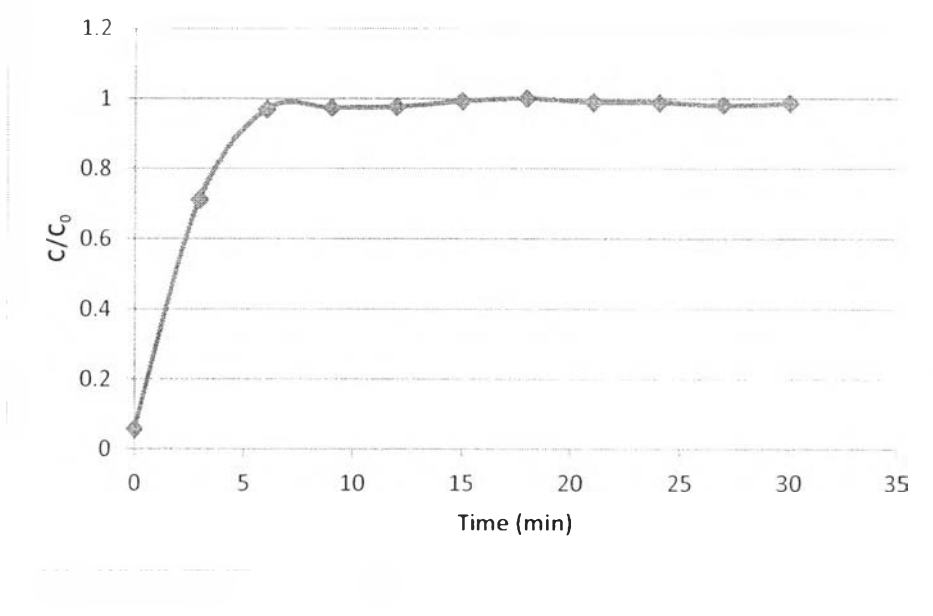

Figure D8 Break through curve of polyHIPE with hexylamine, surfactant ratio 0.81 (recipe 13).

PolyHIPEs with 1,3-diaminopropane (recipe 14)

Weight of polyHIPE: 0.1421 g, flow rate: 3.05 ml/min

TABLE D 9 CO_2 adsorption data of polyHIPE with 1,3-diaminopropane (recipe 13)

Time (min)	Area of CO_2	Retention time (min)	$\%CO_2$ Concentration (C)	C/C_0
0	0	0	0.2517	0.0603
3	6.00	1.27	1.7366	0.4158
6	15.76	1.27	4.1521	0.9941
9	15.61	1.25	4.1150	0.9852
12	15.71	1.27	4.1398	0.9911
15	15.44	1.27	4.0729	0.9751
18	15.61	1.27	4.1150	0.9852
21	15.63	1.25	4.1200	0.9864
24	15.86	1.27	4.1769	1.0000
27	15.82	1.27	4.1670	0.9976

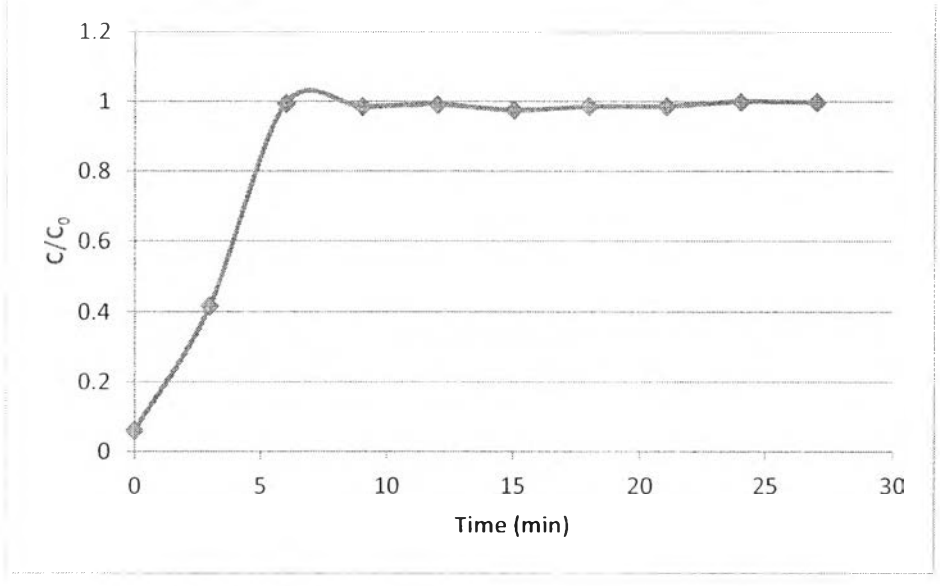

Figure D9 Break through curve of polyHIPE with hexylamine, surfactant ratio 0.87 (recipe 14).

PolyHIPEs with 1,3-diaminopropane (recipe 15)

Weight of polyHIPE: 0.2546 g, flow rate: 3.04 ml/min

TABLE D 10 CO_2 adsorption data of polyHIPE with 1,3-diaminopropane (recipe 15)

Time (min)	Area of CO_2	Retention time (min)	$\%CO_2$ Concentration (C)	C/C_0
0	0	0	0.2517	0.0575
3	14.32	1.28	3.7957	0.8666
6	16.44	1.28	4.3204	0.9864
9	16.64	1.28	4.3699	0.9977
12	16.62	1.28	4.3650	0.9966
15	16.68	1.27	4.3798	1.0000
18	16.66	1.28	4.3748	0.9989
21	16.44	1.27	4.3204	0.9864
24	16.47	1.25	4.3278	0.9881
27	16.63	1.27	4.3674	0.9972
30	16.55	1.27	4.3476	0.9927

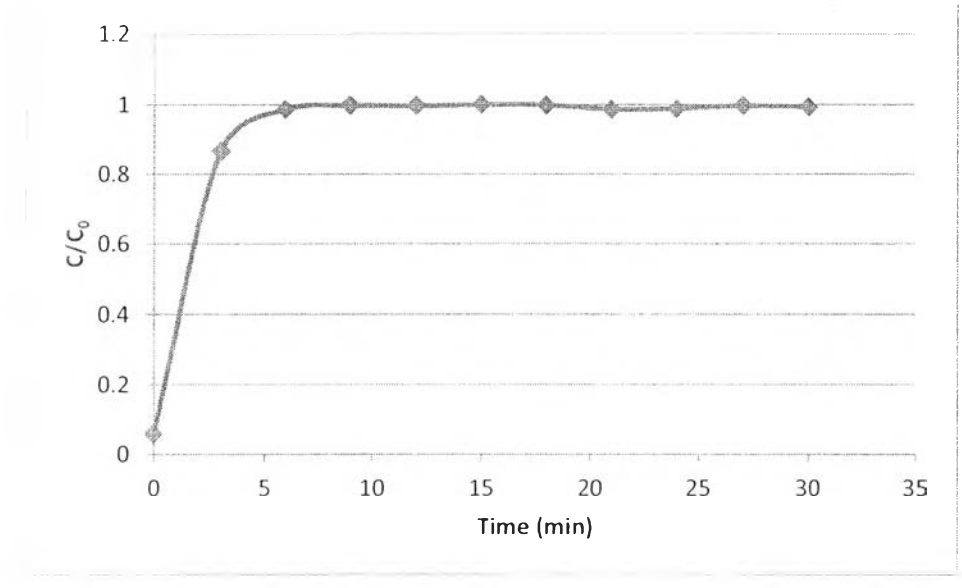

Figure D10 Break through curve of polyHIPE with hexylamine, surfactant ratio 0.93 (recipe 15).

Effect of moisture on CO_2 adsorption

Moisturized polyHIPEs with hexylamine (recipe 7)

Weight of polyHIPE: 0.2422 g, flow rate: 3.09 ml/min

TABLE D 11 CO_2 adsorption data of moisturized polyHIPE with hexylamine (recipe 7)

Time (min)	Area of CO_2	Retention time (min)	$\%CO_2$ Concentration (C)	C/C_0
0	0	0	0.2517	0.0590
3	14.85	1.32	3.9269	0.9211
6	15.02	1.32	3.9690	0.9309
9	16.16	1.32	4.2511	0.9971
12	15.64	1.32	4.1224	0.9669
15	16.15	1.30	4.2487	0.9965
18	15.75	1.32	4.1497	0.9733
21	16.21	1.33	4.2635	1.0000
24	16.17	1.32	4.2536	0.9977

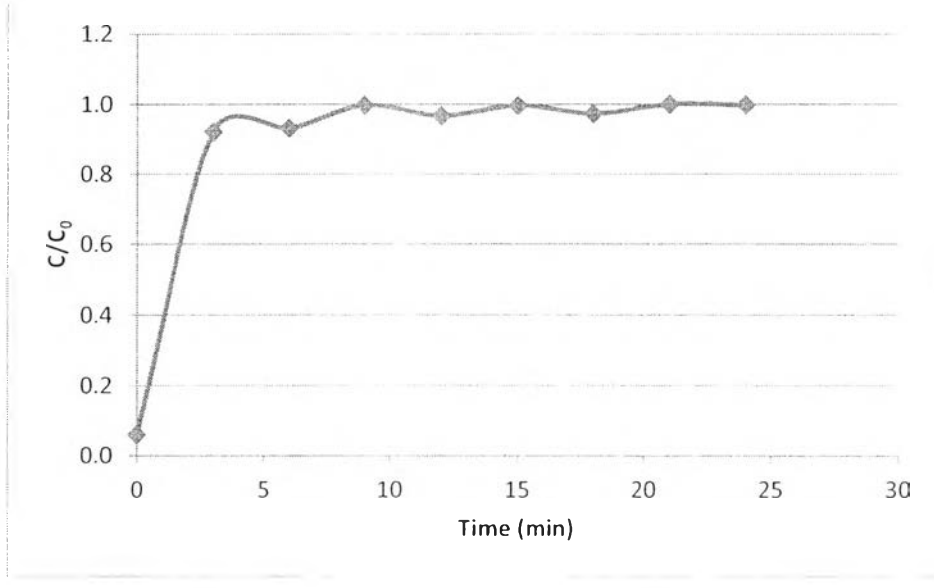

Figure D11 Break through curve of moisturized polyHIPE with hexylamine, surfactant ratio 1.20 (recipe 7).

Moisturized polyHIPEs with hexylamine (recipe 8)

Weight of polyHIPE: 0.2467 g, flow rate: 3.10 ml/min

TABLE D 12 CO_2 adsorption data of moisturized polyHIPE with hexylamine (recipe 8)

Time (min)	Area of CO_2	Retention time (min)	%CO_2 Concentration (C)	C/C_0
0	0	0	0.2517	0.0589
3	12.40	1.32	3.3206	0.7775
6	15.51	1.32	4.0903	0.9577
9	15.85	1.32	4.1744	0.9774
12	15.83	1.32	4.1695	0.9762
15	16.24	1.30	4.2709	1.0000
18	15.94	1.27	4.1967	0.9826
21	16.10	1.32	4.2363	0.9919
24	15.95	1.32	4.1992	0.9832

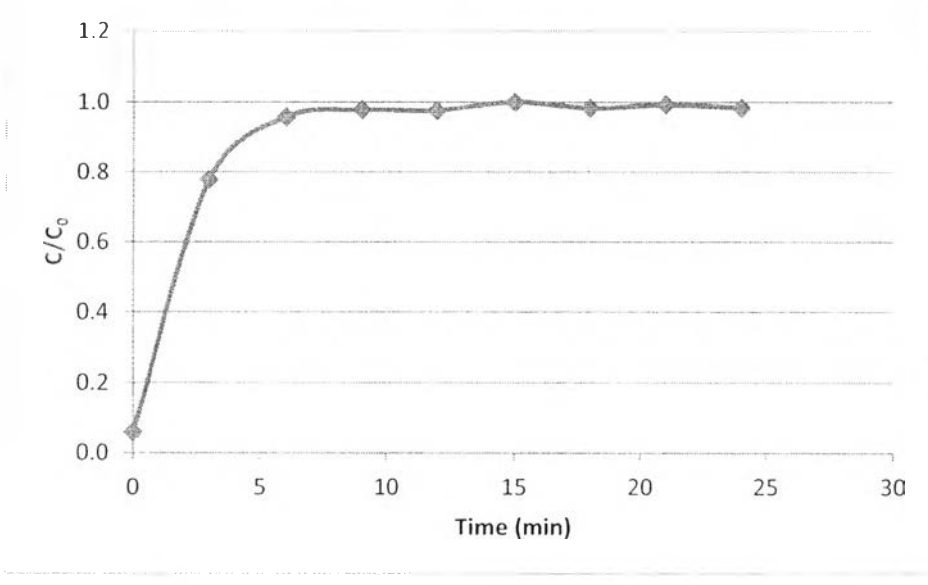

Figure D12 Break through curve of moisturized polyHIPE with hexylamine, surfactant ratio 1.33 (recipe 8).

Moisturized polyHIPEs with hexylamine (recipe 9)

Weight of polyHIPE: 0.2540 g, flow rate: 3.12 ml/min

TABLE D 13 CO_2 adsorption data of moisturized polyHIPE with hexylamine (recipe 9)

Time (min)	Area of CO_2	Retention time (min)	$\%CO_2$ Concentration (C)	C/C_0
0	0	0	0.2517	0.0598
3	13.36	1.30	3.5582	0.8449
6	15.6	1.32	4.1125	0.9765
9	15.86	1.32	4.1769	0.9918
12	15.96	1.33	4.2016	0.9976
15	15.98	1.32	4.2066	0.9988
18	16	1.32	4.2115	1.0000
21	15.90	1.28	4.1868	0.9941
24	15.86	1.32	4.1769	0.9918

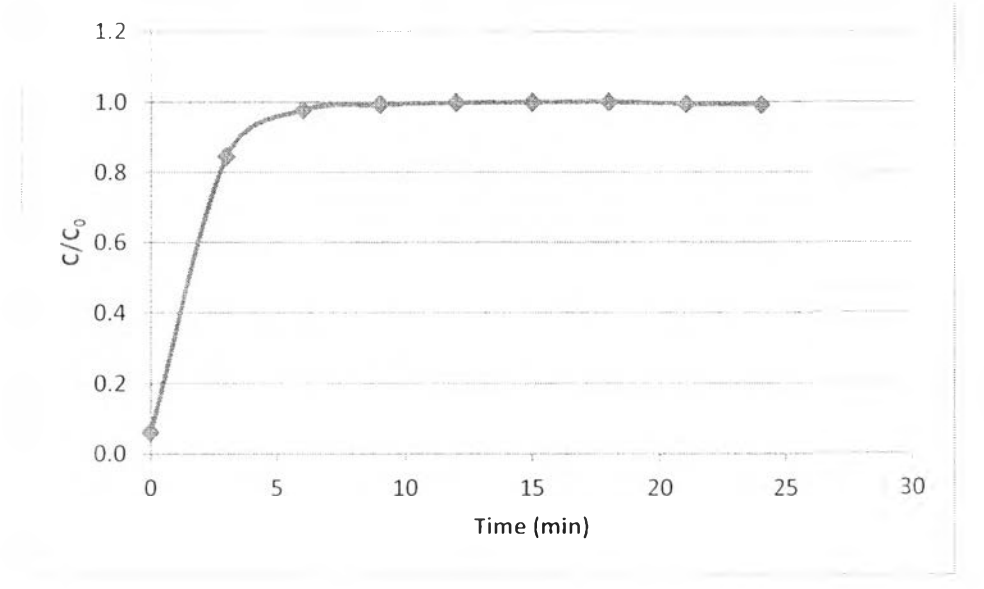

Figure D13 Break through curve of moisturized polyHIPE with hexylamine, surfactant ratio 1.50 (recipe 9).

Moisturized polyHIPEs with hexylamine (recipe 10)

Weight of polyHIPE: 0.2694 g, flow rate: 3.11 ml/min

TABLE D 14 CO_2 adsorption data of moisturized polyHIPE with hexylamine (recipe 10)

Time (min)	Area of CO_2	Retention time (min)	%CO_2 Concentration (C)	C/C_0
0	0	0	0.2517	0.0594
3	12.74	1.37	3.4047	0.8028
6	15.73	1.27	4.1447	0.9772
9	15.80	1.30	4.1620	0.9813
12	15.94	1.32	4.1967	0.9895
15	16.22	1.32	4.2660	1.0058
18	16.01	1.32	4.2140	0.9936
21	15.77	1.32	4.1546	0.9796
24	16.12	1.27	4.2412	1.0000

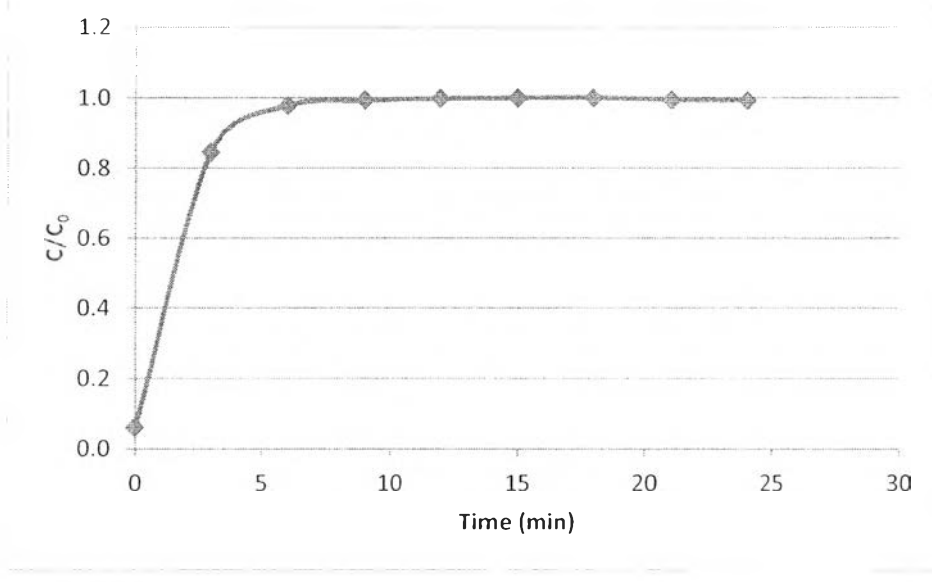

Figure D14 Break through curve of moisturized polyHIPE with hexylamine, surfactant ratio 1.71 (recipe 10).

Appendix E Amine Loading of PolyHIPE

PolyHIPE reference (recipe 2)

TABLE E 1 CHN result of polyHIPE reference (recipe 2)

Sample	Mass	%C	%H	%N
1	0.06878	91.24	8.278	-0.44482
2	0.08369	88.55	8.368	-0.40213
Average				-0.42348

PolyHIPE with hexylamine (recipe 7)

TABLE E 2 CHN result of polyHIPE with hexylamine (recipe 7)

Sample	Mass	%C	%H	%N
1	0.08501	85.24	8.403	-0.07911
2	0.08401	85.60	8.325	-0.18702
Average				-0.13306

PolyHIPE with hexylamine (recipe 8)

TABLE E 3 CHN result of polyHIPE with hexylamine (recipe 8)

Sample	Mass	%C	%H	%N
1	0.08357	83.97	7.989	-0.11214
2	0.08020	84.38	8.474	-0.07207
Average				-0.09210

PolyHIPE with hexylamine (recipe 9)

TABLE E 4 CHN result of polyHIPE with hexylamine (recipe 8)

Sample	Mass	%C	%H	%N
1	0.08152	84.58	8.047	-0.09901
2	0.08128	84.91	8.683	0.13349
Average				0.44024

PolyHIPE with hexylamine (recipe 10)

Table E5 CHN result of polyHIPE with hexylamine (recipe 10)

Sample	Mass	%C	%H	%N
1	0.08267	77.77	8.872	-0.05851
2	0.08005	77.59	8.83	-0.10782
Average				-0.08316

PolyHIPE with 1,3-diaminopropane (recipe 11)

TABLE E 6 CHN result of polyHIPE with 1,3-diaminopropane (recipe 11)

Sample	Mass	%C	%H	%N
1	0.05107	71.54	7.682	3.3731
Average				3.3731

PolyHIPE with 1,3-diaminopropane (recipe 12)

TABLE E 7 CHN result of polyHIPE with 1,3-diaminopropane (recipe 12)

Sample	Mass	%C	%H	%N
1	0.03504	71.67	6.681	3.2505
Average				3.2505

PolyHIPE with 1,3-diaminopropane (recipe 13)

TABLE E 8 CHN result of polyHIPE with 1,3-diaminopropane (recipe 13)

Sample	Mass	%C	%H	%N
1	0.03946	69.59	7.518	3.0761
Average				3.0761

PolyHIPE with 1,3-diaminopropane (recipe 14)

Table E9 CHN result of polyHIPE with 1,3-diaminopropane (recipe 14)

Sample	Mass	%C	%H	%N
1	0.07872	77.21	8.406	1.8016
Average				1.8016

PolyHIPE with 1,3-diaminopropane (recipe 15)

Table E9 CHN result of polyHIPE with 1,3-diaminopropane (recipe 15)

Sample	Mass	%C	%H	%N
1	0.08319	74.70	8.998	0.32629
Average				0.32629

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1. Threepopnatkul, P., Kaerkitcha, N., and Athipongarporn, N. (2009). Effect of surface treatment on performance of pineapple leaf fiber–polycarbonate composites. Composites: Part B, 40, 638-632.

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