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APPENDICES

Appendix A The Catalytic Activity, 1-hexene Selectivity, 1-hexene Yield of Pd and Ni Mono Metallic Supported on Alumina Catalyst

Example: 0.3%Ni/Al_2O_3

Reaction Time(hour)	Peak area			Mole of Components			%Conv.	%1-Hexene Selec.	%1-Hexene Yield
	1-Hexyne	1-Hexene	*n*-hexane	Mole 1-Hexyne	Mole 1-hexene	Mole *n*-hexane			
0	24634	0	0	1.25 E-06	0	0	0	0	0
0.5	13736	12216	4590	0.68 E-06	0.38 E-06	0.15 E-06	45.99	66.21	30.45
1.0	9551	18780	4898	0.45 E-06	0.59 E-06	0.15 E-06	63.72	74.39	47.41
1.5	7432	23304	4827	0.34 E-06	0.74 E-06	0.15 E-06	72.70	81.28	59.10
2.0	3754	29967	4184	0.15 E-06	0.95 E-06	0.15 E-06	88.29	86.43	76.31
2.5	2256	32769	5340	0.07 E-06	1.04 E-06	0.19 E-06	95.91	84.86	84.01
3.0	11.9	31586	7160	0	1.01 E-06	0.24 E-06	100.00	80.49	80.49

Calculation: At 0.5 hours

Sol^{n} From 1-Hexyne conversion (%1-Hy_{conv}) $= \dfrac{(\text{moles of 1-hy}_{initial} - \text{moles of 1-hy}_{final}) \times 100}{\text{moles of 1-hy}_{initial}}$

$= \dfrac{1.25\times10^{-6} - 0.68\times10^{-6}}{1.25\times10^{-6}} \times 100$

$= 45.99\ \%$

From 1-Hexene selectivity (%1-$Hexene_{sel}$) $= \dfrac{(\text{moles of 1-He}_{final} - \text{moles of 1-He}_{initial}) \times 100}{\text{moles of 1-hexyne converted}}$

$= \dfrac{0.38\times10^{-6}}{(1.25\times10^{-6} - 0.68\times10^{-6})} \times 100$

$= 66.21\ \%$

From 1-Hexene yield (%1-$Hexene_{Yield}$) $= \dfrac{\%\text{Conversion} \times \%\text{Selectivity}}{100}$

$= \dfrac{45.99 \times 66.21}{100}$

$= 30.45\ \%$

Table A1 The catalytic activity, 1-hexene selectivity and 1-hexene yield of 0.3%Pd supported on alumina catalyst

0.3%Pd					
Reaction time (h)	**0.5**	**1.0**	**1.5**	**2.0**	**2.5**
1-Hexyne conversion (%)	53	65	83	95	100
1-Hexene selectivity (%)	56	70	80	78	68
1-Hexene yield (%)	32	48	67	74	68

Table A2 The catalytic activity, 1-hexene selectivity and 1-hexene yield of 1%Ni supported on alumina catalyst

1%Ni						
Reaction time (h)	**0.5**	**1.0**	**1.5**	**2.0**	**2.5**	**3.0**
1-Hexyne conversion (%)	80	90	95	98	99	100
1-Hexene selectivity (%)	59	55	55	45	45	38
1-Hexene yield (%)	45	48	51	43	44	38

Table A3 The catalytic activity, 1-hexene selectivity and 1-hexene yield of 1.5%Ni supported on alumina catalyst

1.5%Ni						
Reaction time (h)	**0.5**	**1.0**	**1.5**	**2.0**	**2.5**	**3.0**
1-Hexyne conversion (%)	79	87	92	95	100	100
1-Hexene selectivity (%)	63	54	56	54	41	34
1-Hexene yield (%)	49	47	52	52	41	34

Table A4 The catalytic activity, 1-hexene selectivity and 1-hexene yield of 2%Ni supported on alumina catalyst

2%Ni						
Reaction time (h)	**0.5**	**1.0**	**1.5**	**2.0**	**2.5**	**3.0**
1-Hexyne conversion (%)	71	83	91	95	100	100
1-Hexene selectivity (%)	60	63	63	54	47	34
1-Hexene yield (%)	42	52	57	52	47	34

Table A5 The catalytic activity, 1-hexene selectivity and 1-hexene yield of 3%Ni supported on alumina catalyst

3%Ni						
Reaction time (h)	**0.5**	**1.0**	**1.5**	**2.0**	**2.5**	**3.0**
1-Hexyne conversion (%)	68	79	88	96	97	98
1-Hexene selectivity (%)	66	64	56	49	43	39
1-Hexene yield (%)	53	57	54	48	42.4	39

Appendix B The Catalytic Activity, 1-hexene Selectivity and 1-hexene Yield of Ni-Mn Supported on Alumina Catalysts

Table B1 The catalytic activity, 1-hexene selectivity and 1-hexene yield of Ni-Mn with Ni/Mn ratio of 0.5

Ni-Mn ratio 0.5					
Reaction time (h)	**0.5**	**1.0**	**1.5**	**2.0**	**2.5**
1-Hexyne conversion (%)	52	60	4	87	100
1-Hexene selectivity (%)	75	86	93	92	90
1-Hexene yield (%)	39	51	68	78	91

Table B2 The catalytic activity, 1-hexene selectivity and 1-hexene yield of Ni-Mn with Ni/Mn ratio of 1.0

Ni-Mn 1.0					
Reaction time (h)	**0.5**	**1.0**	**1.5**	**2.0**	**2.5**
1-Hexyne conversion (%)	52	65	78	88	100
1-Hexene selectivity (%)	80	86	92	93	92
1-Hexene yield (%)	40	45	60	72	81

Table B3 The catalytic activity, 1-hexene selectivity and 1-hexene yield of Ni-Mn with Ni/Mn ratio of 1.5

Ni-Mn 1.5					
Reaction time (h)	**0.5**	**1.0**	**1.5**	**2.0**	**2.5**
1-Hexyne conversion (%)	52	62	74	89	100
1-Hexene selectivity (%)	78	84	89	90	85
1-Hexene yield (%)	41	52	66	79	85

Table B4 The catalytic activity, 1-hexene selectivity and 1-hexene yield of Ni-Mn with Ni/Mn ratio of 2.0

Ni-Mn 2.0					
Reaction time (h)	**0.5**	**1.0**	**1.5**	**2.0**	**2.5**
1-Hexyne conversion (%)	52	65	74	85	100
1-Hexene selectivity (%)	63	74	85	86	83
1-Hexene yield (%)	33	48	62	73	83

Appendix C The Catalytic Activity, 1-hexene Selectivity and 1-hexene Yield of Pd-Ni Supported on Alumina Catalysts

Table C1 The catalytic activity, 1-hexene selectivity and 1-hexene yield of Pd-Ni with Pd/Ni ratio of 0.5

Pd-Ni 0.5					
Reaction time (h)	**0.5**	**1.0**	**1.5**	**2.0**	**2.5**
1-Hexyne conversion (%)	56	71	80	94	100
1-Hexene selectivity (%)	62	69	82	82	79
1-Hexene yield (%)	35	49	66	77	79

Table C2 The catalytic activity, 1-hexene selectivity and 1-hexene yield of Pd-Ni with Pd/Ni ratio of 1.0

Pd-Ni 1.0					
Reaction time (h)	**0.5**	**1.0**	**1.5**	**2.0**	**2.5**
1-Hexyne conversion (%)	52	65	80	95	100
1-Hexene selectivity (%)	56	70	80	78	68
1-Hexene yield (%)	29	46	64	74	68

Table C3 The catalytic activity, 1-hexene selectivity and 1-hexene yield of Pd-Ni with Pd/Ni ratio of 1.5

Pd-Ni 1.5					
Reaction time (h)	**0.5**	**1.0**	**1.5**	**2.0**	**2.5**
1-Hexyne conversion (%)	50	67	85	96	100
1-Hexene selectivity (%)	67	77	85	84	78
1-Hexene yield (%)	39	52	72	81	78

Table C4 The catalytic activity, 1-hexene selectivity and 1-hexene yield of Pd-Ni with Pd/Ni ratio of 2.0

Pd-Ni 2.0					
Reaction time (h)	**0.5**	**1.0**	**1.5**	**2.0**	**2.5**
1-Hexyne conversion (%)	50	63	78	91	100
1-Hexene selectivity (%)	70	82	88	88	87
1-Hexene yield (%)	35	51	69	80	87

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2. Khunkaew, K.; and Kitiyanan, B. Selective Hydrogenation of 1-Hexyne Using Pd/Al_2O_3 and Ni/Al_2O_3 Catalysts. Poster presented at The 21th PPC Symposium on Petroleum, Petrochemicals, and Polymers, Bangkok, Thailand.