

Hydrogenation of the Liquid Organic Hydrogen Carrier Compound Dibenzyltoluene – Reaction Pathway Determination by $^1\text{H-NMR}$ Spectroscopy

G. Do, P. Preuster, R. Aslam, A. Bösmann, K. Müller, W. Arlt and P. Wasserscheid

Supporting Information

Predicted Data

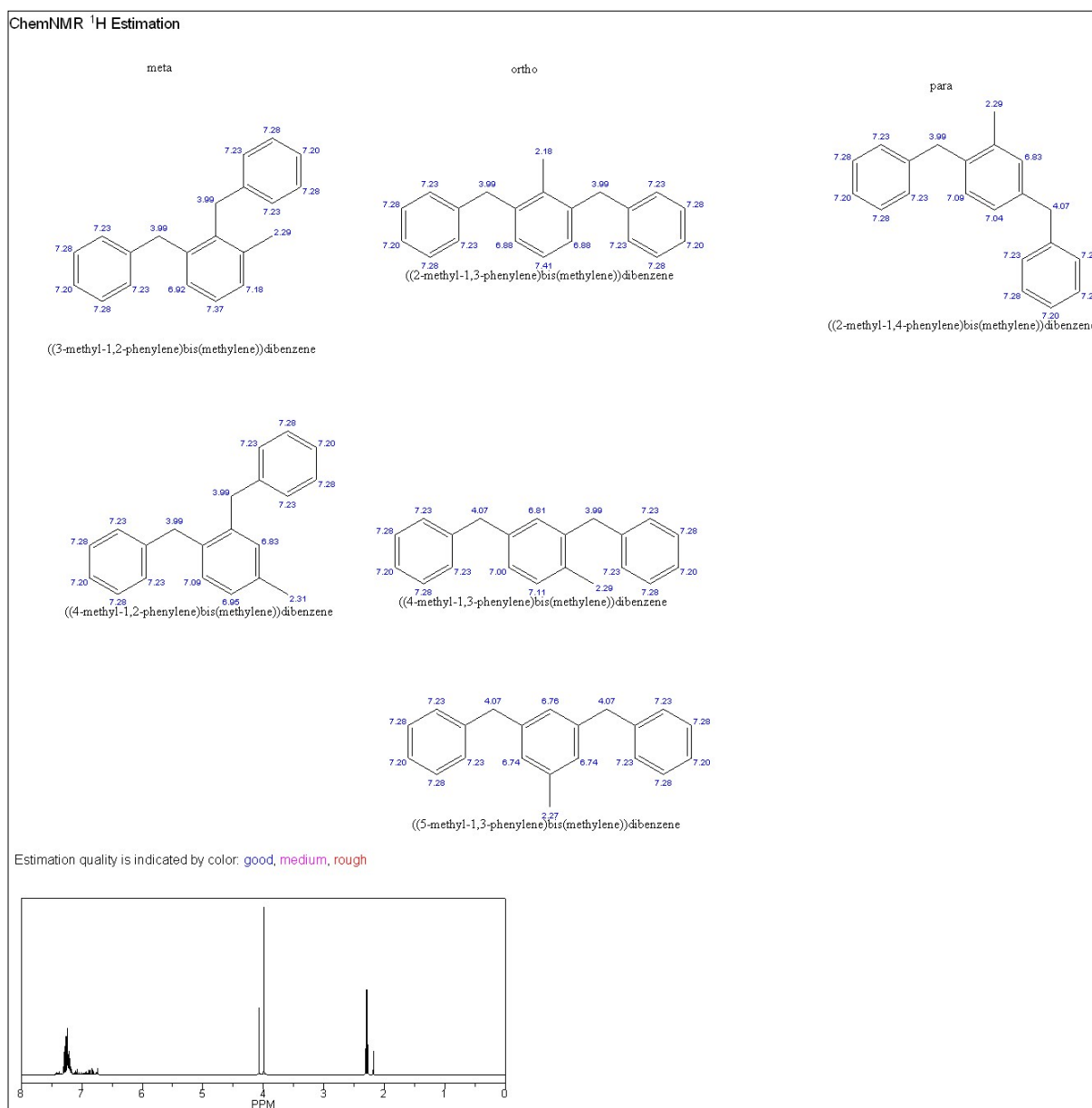
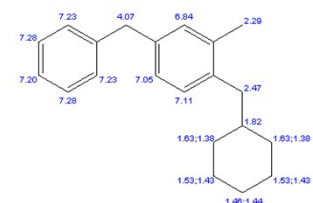
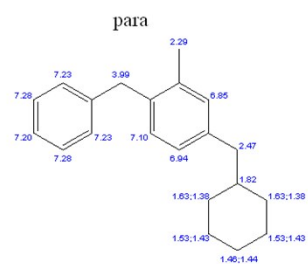
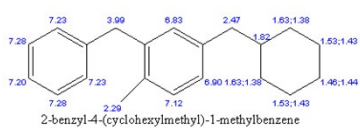
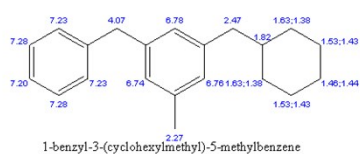
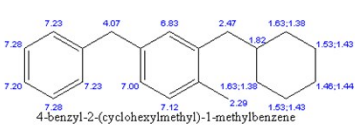
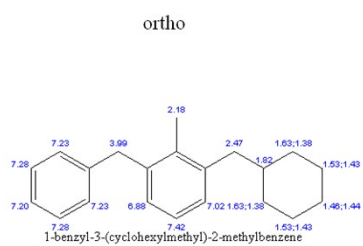
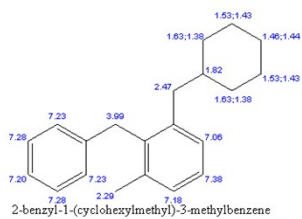
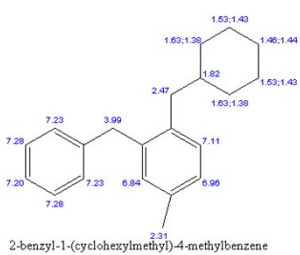
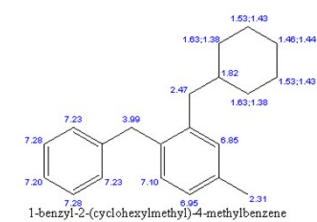
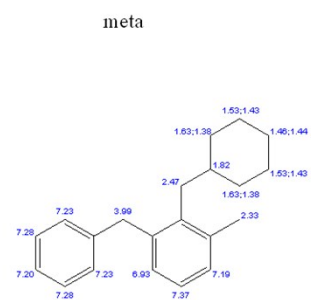


Figure S 1: All H0-DBT₀₀₀ structural isomers with respective predicted chemical shifts of ^1H NMR (combined in spectrum)

ChemNMR ¹H Estimation



4-benzyl-1-(cyclohexylmethyl)-2-methylbenzene

Estimation quality is indicated by color: good, medium, rough

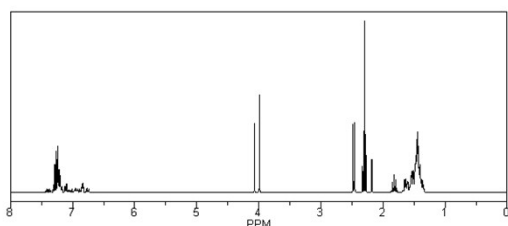
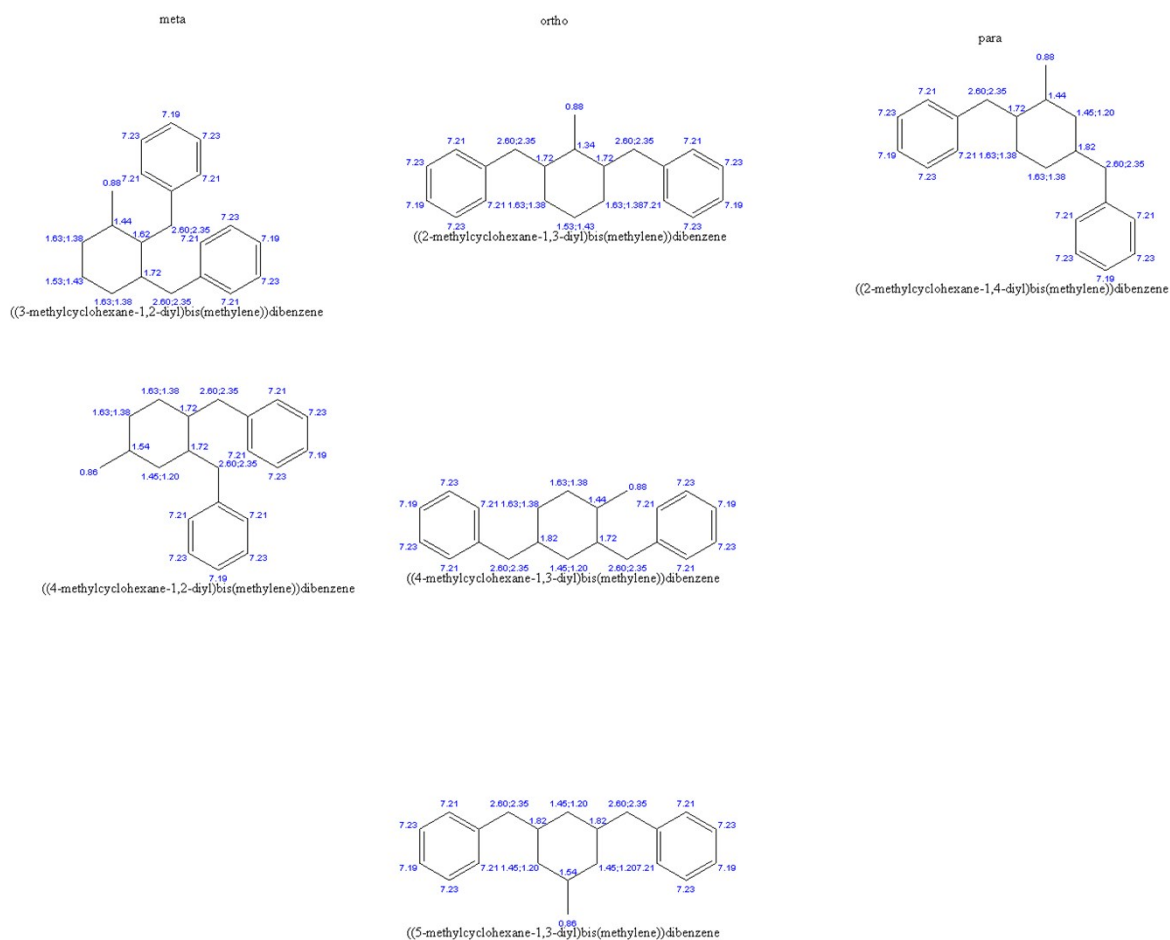


Figure S 2: All H6-DBT_{OOx} structural isomers with respective predicted chemical shifts of ¹H NMR (combined in spectrum)

ChemNMR ¹H Estimation



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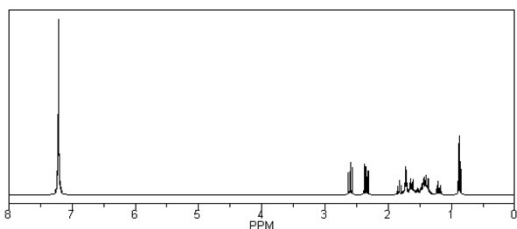
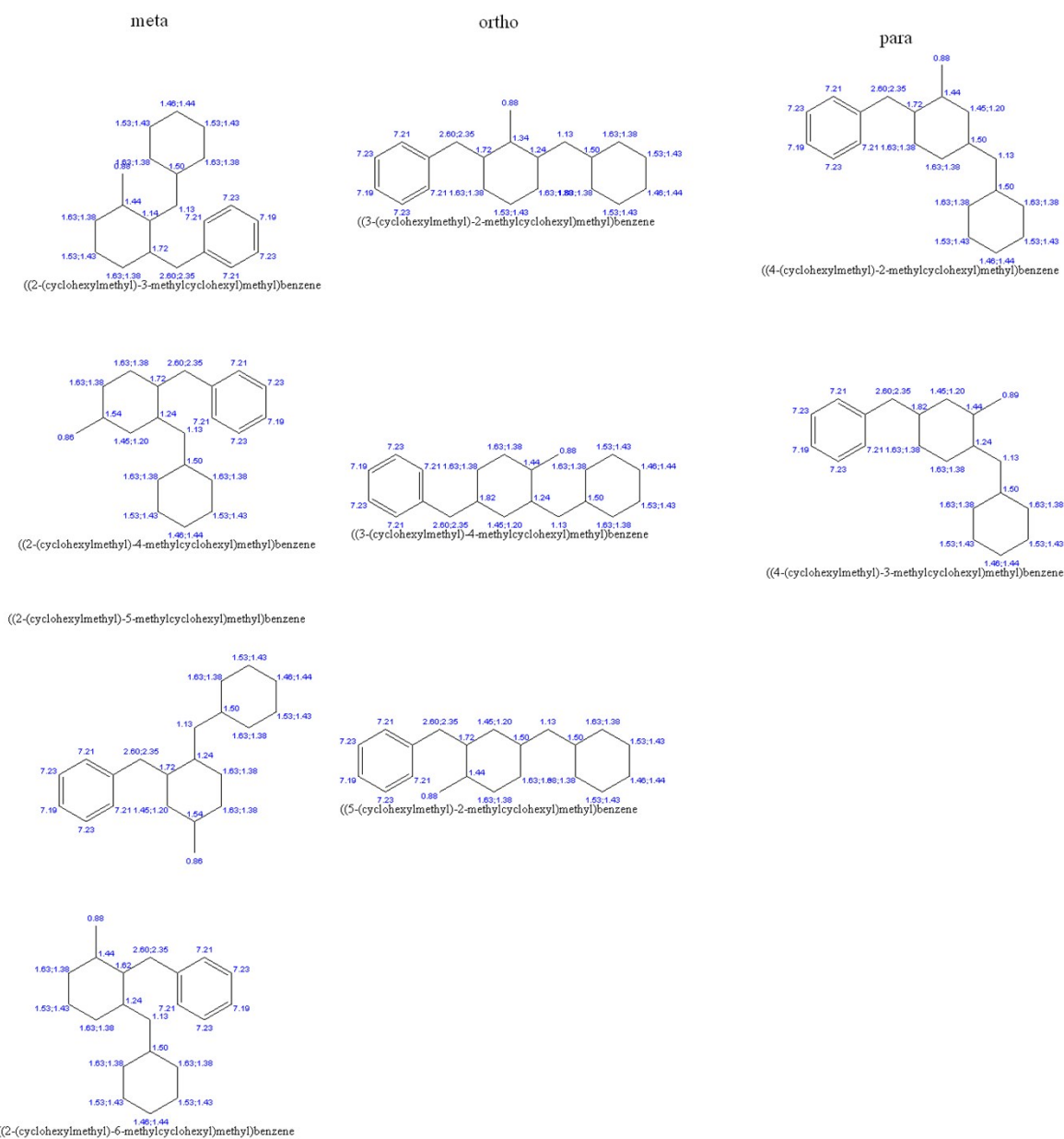


Figure S 3: All H6-DBT_{OxO} structural isomers with respective predicted chemical shifts of ¹H NMR (combined in spectrum)

ChemNMR ¹H Estimation

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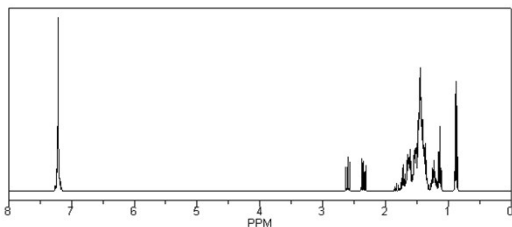
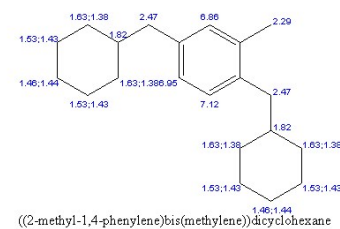
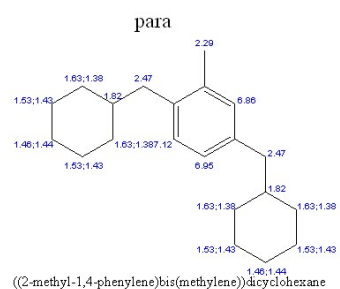
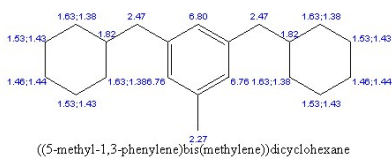
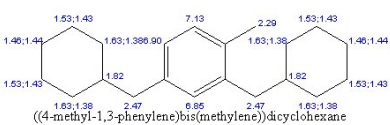
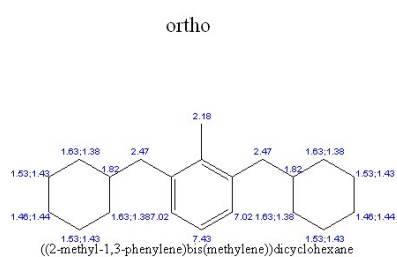
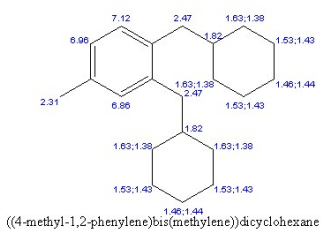
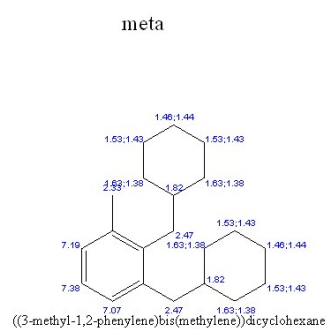


Figure S 4: All H12-DBT_{OX} structural isomers with respective predicted chemical shifts of ¹H NMR (combined in spectrum)

ChemNMR ¹H Estimation



Estimation quality is indicated by color: good, medium, rough

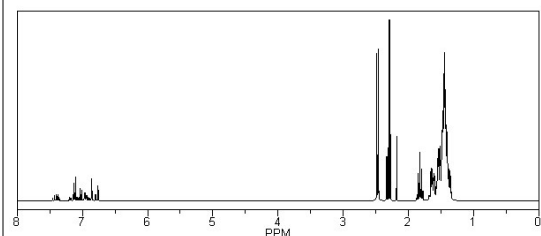
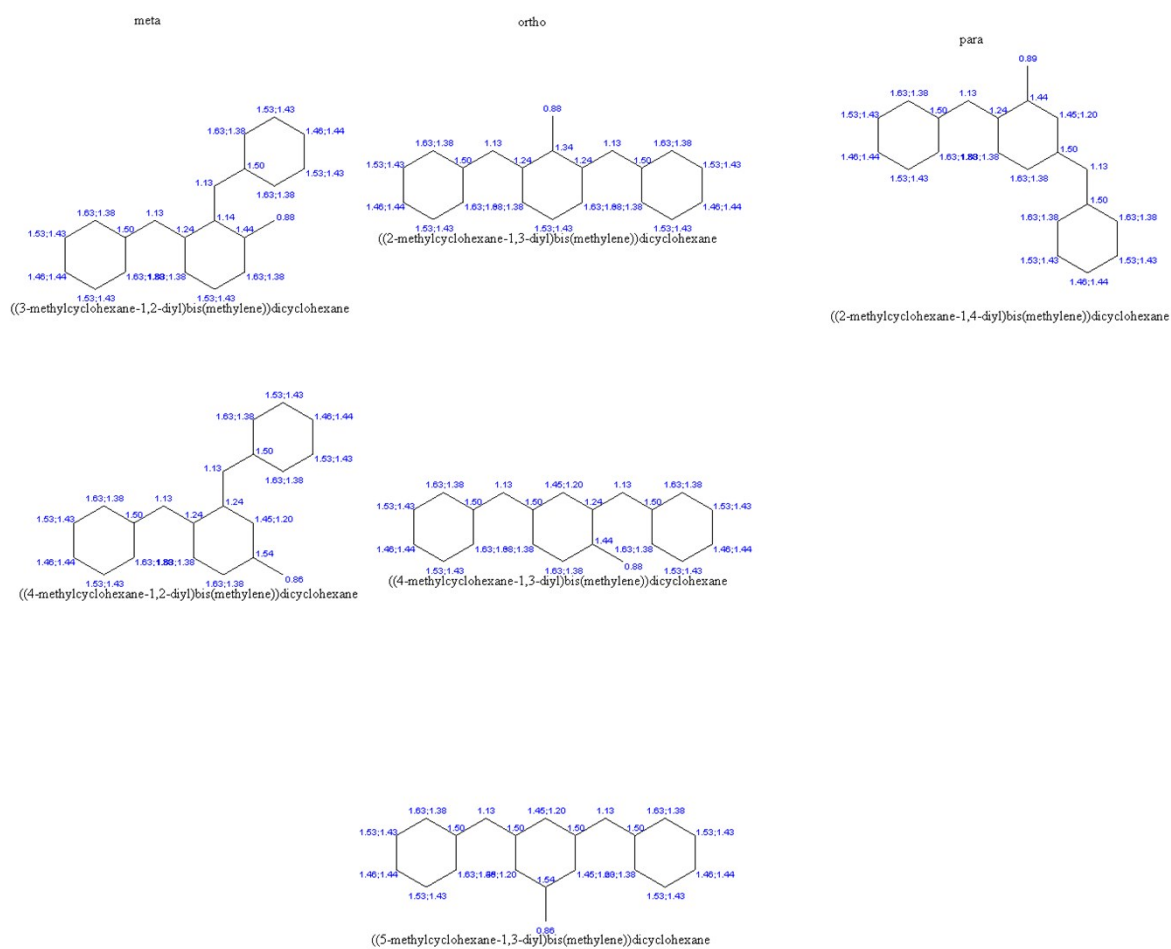


Figure S 5: All H12-DBT_{XOX} structural isomers with respective predicted chemical shifts of ¹H NMR (combined in spectrum)

ChemNMR ¹H Estimation



Estimation quality is indicated by color: good, medium, rough

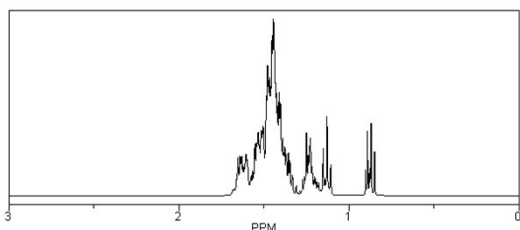


Figure S 6: All H12-DBT_{XXX} structural isomers with respective predicted chemical shifts of ¹H NMR (combined in spectrum)

Experimental Data

T = 120 °C ; P = 50 bar

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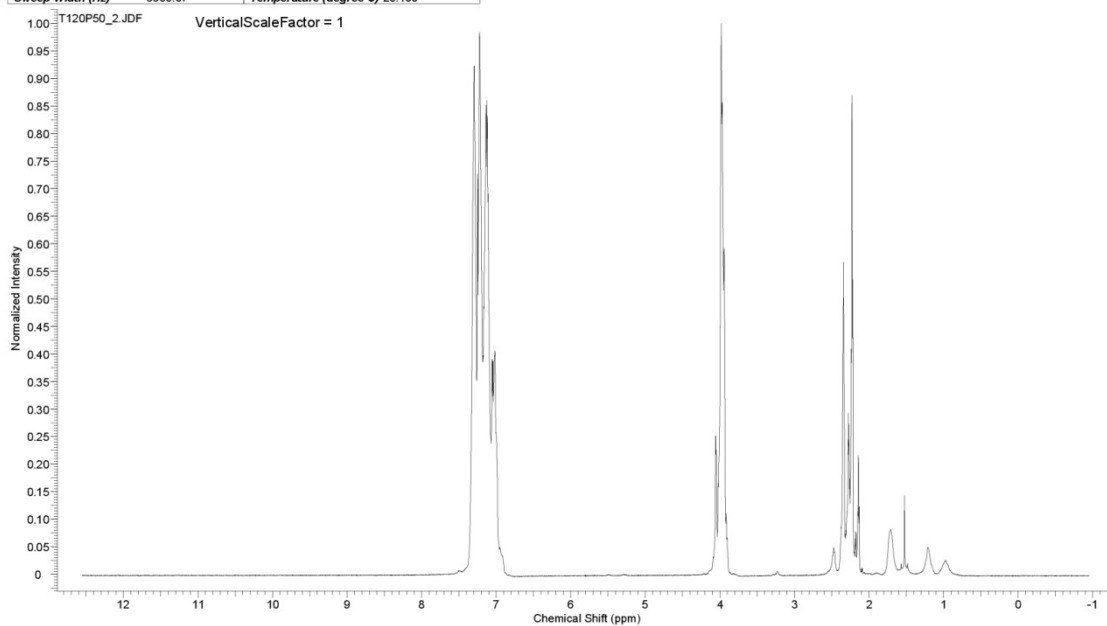


Figure S 7: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 2$ min (T=120°C; P=50 bar; Cat.: 0.5 wt% Ru/Al₂O₃; m[H₀-DBT] = 150 g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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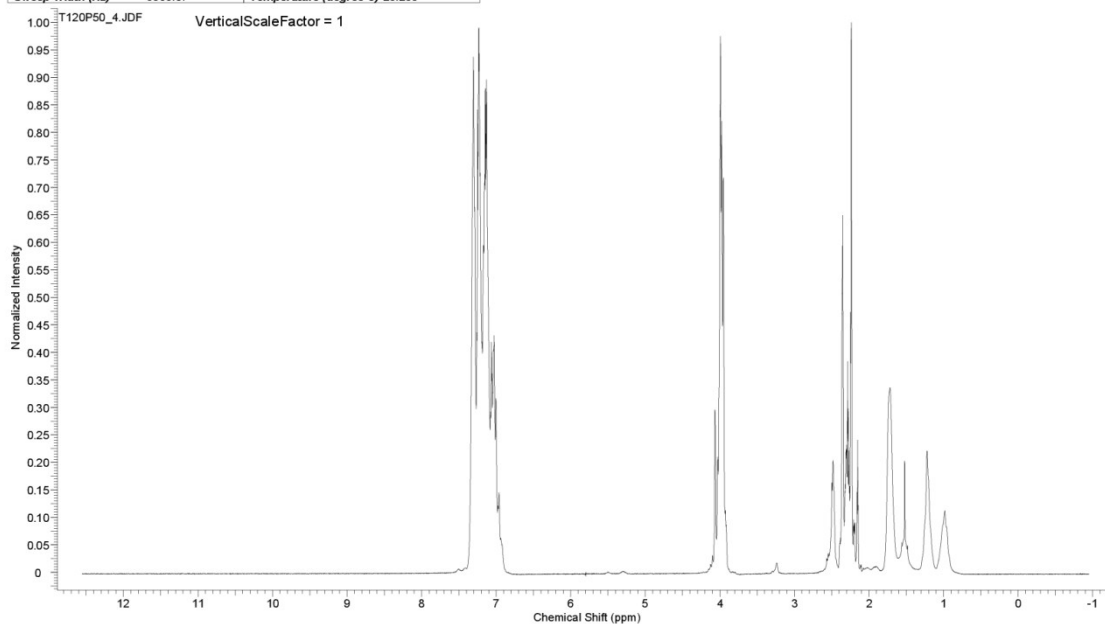


Figure S 8: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 4$ min ($T=120^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

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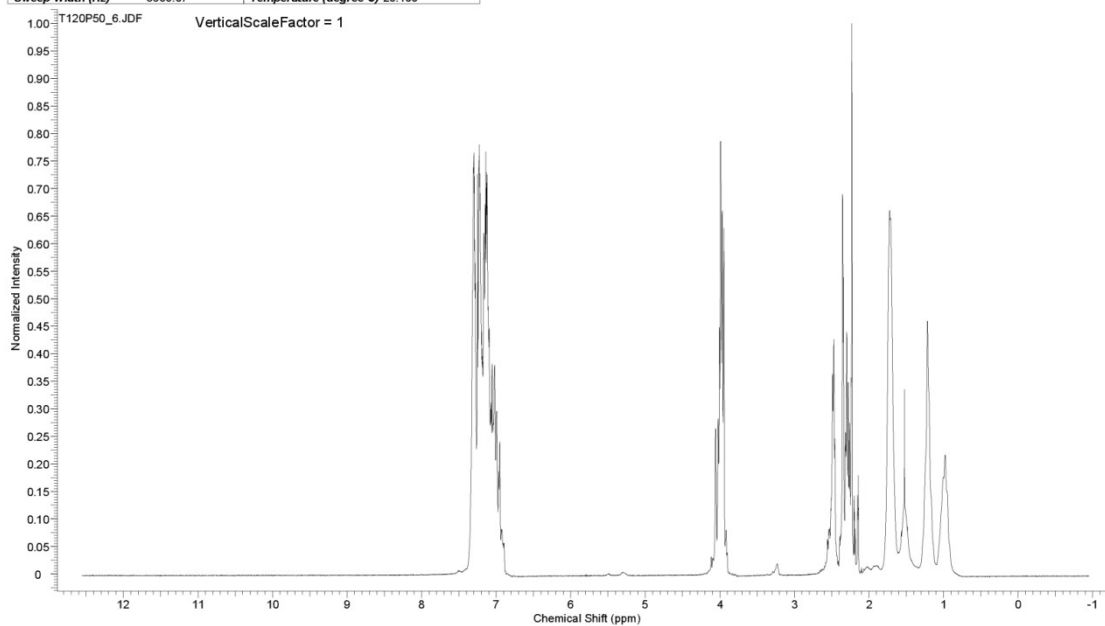


Figure S 9: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 6$ min ($T=120^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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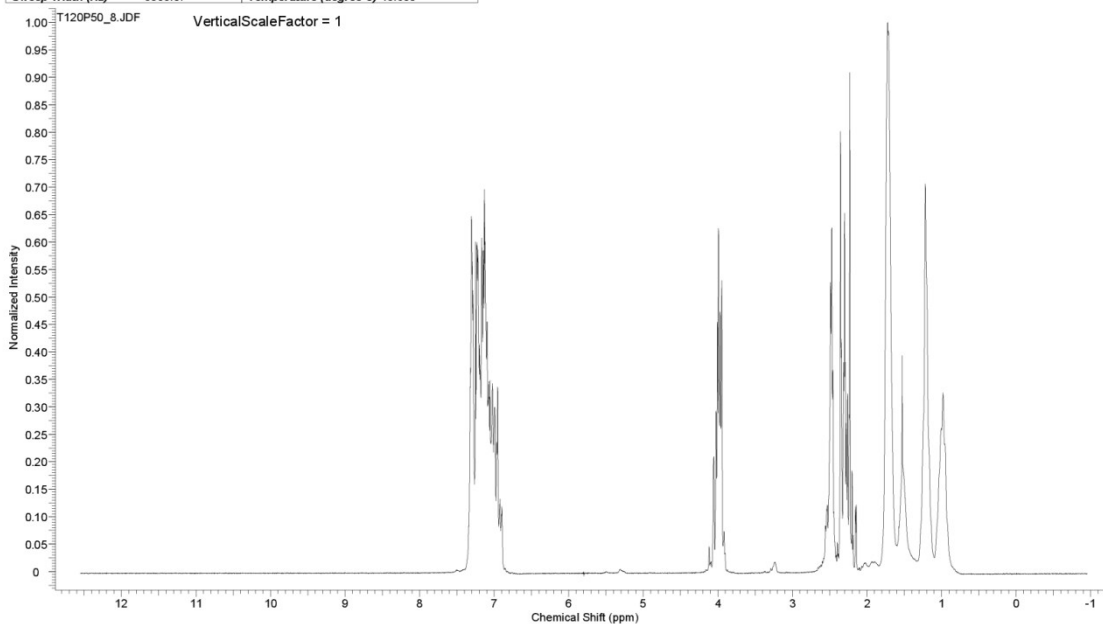


Figure S 10: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 8$ min ($T=120^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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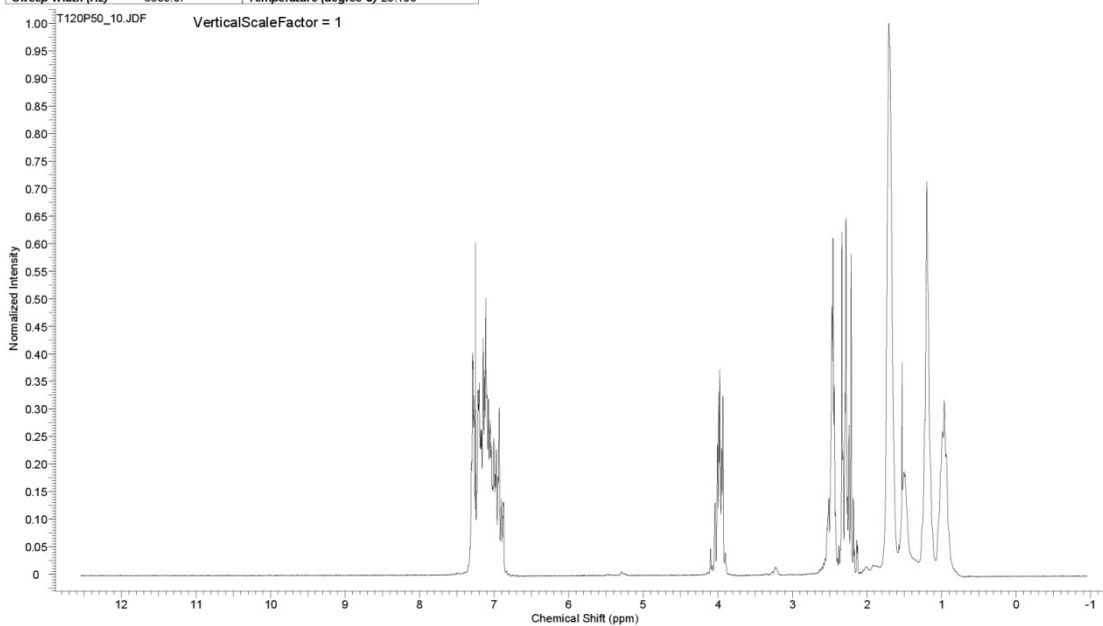


Figure S 11: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 10$ min ($T=120^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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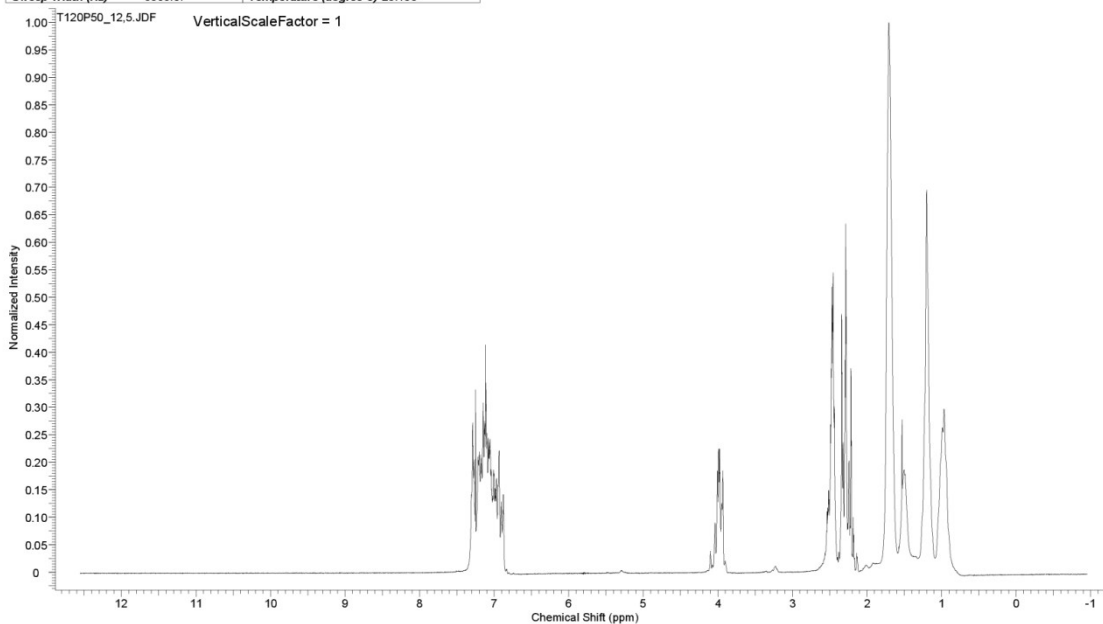


Figure S 12: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 12.5$ min ($T=120^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% $\text{Ru}/\text{Al}_2\text{O}_3$; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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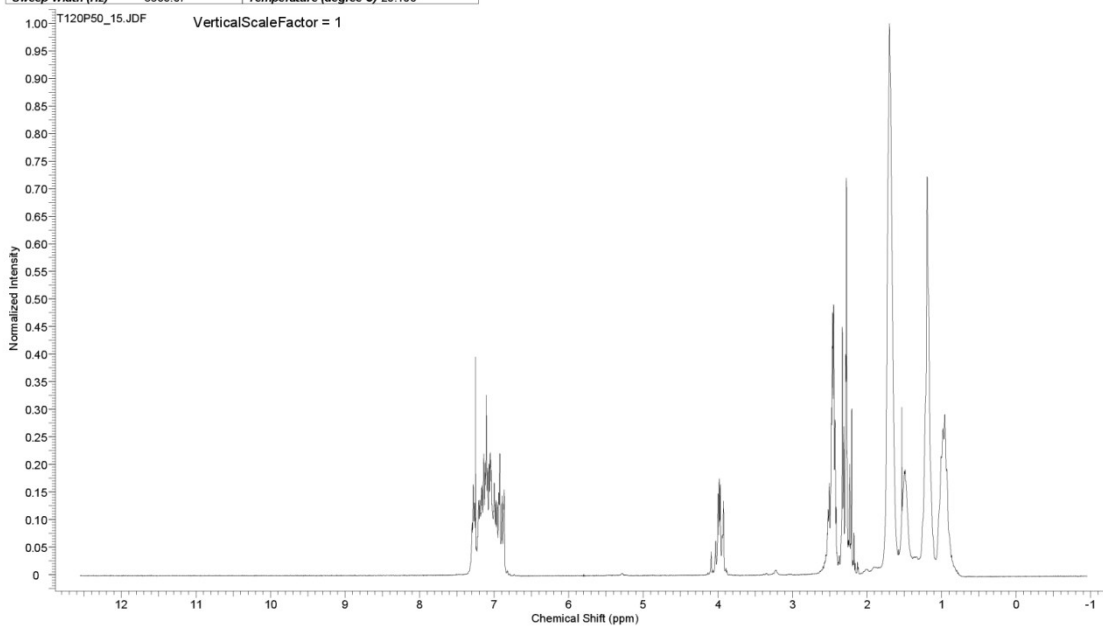


Figure S 13: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 15$ min ($T=120^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% $\text{Ru}/\text{Al}_2\text{O}_3$; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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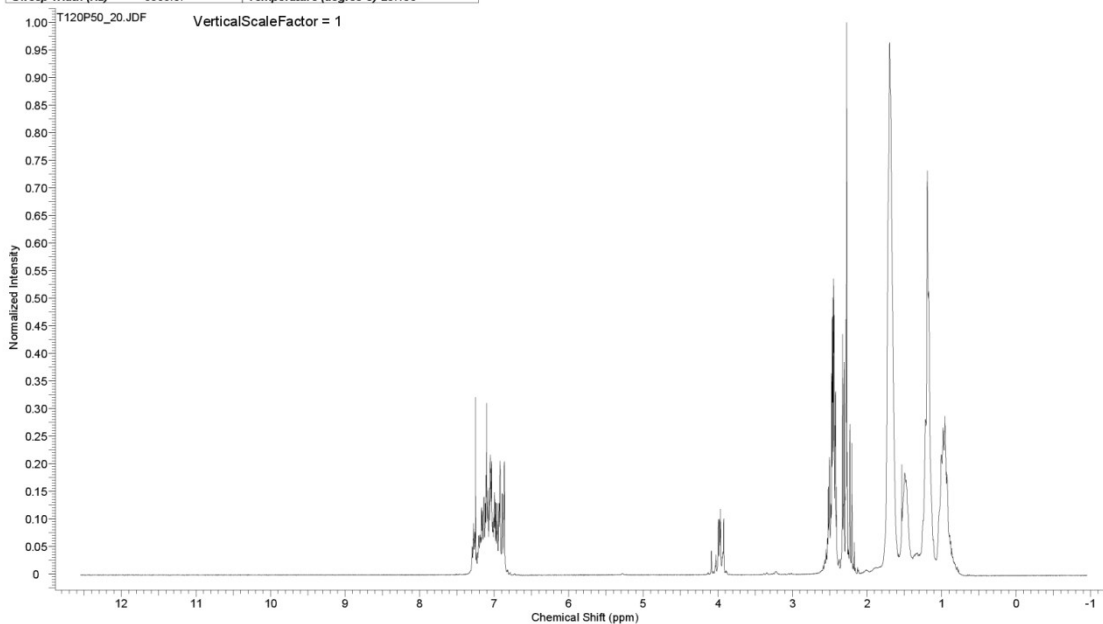


Figure S 14: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 20$ min ($T=120^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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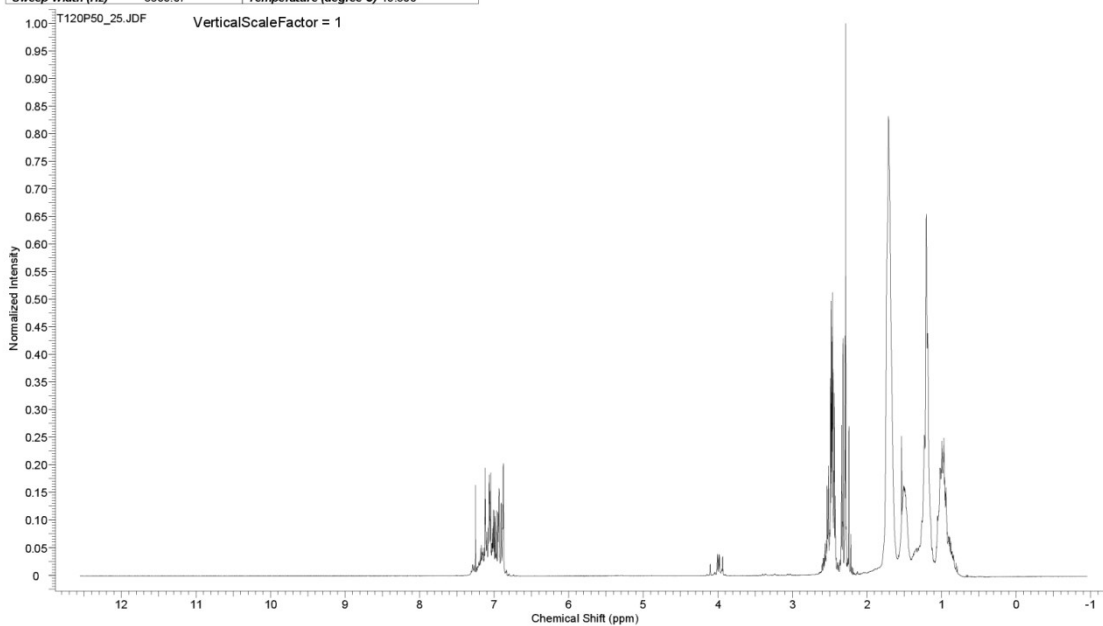


Figure S 15: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 25$ min ($T=120^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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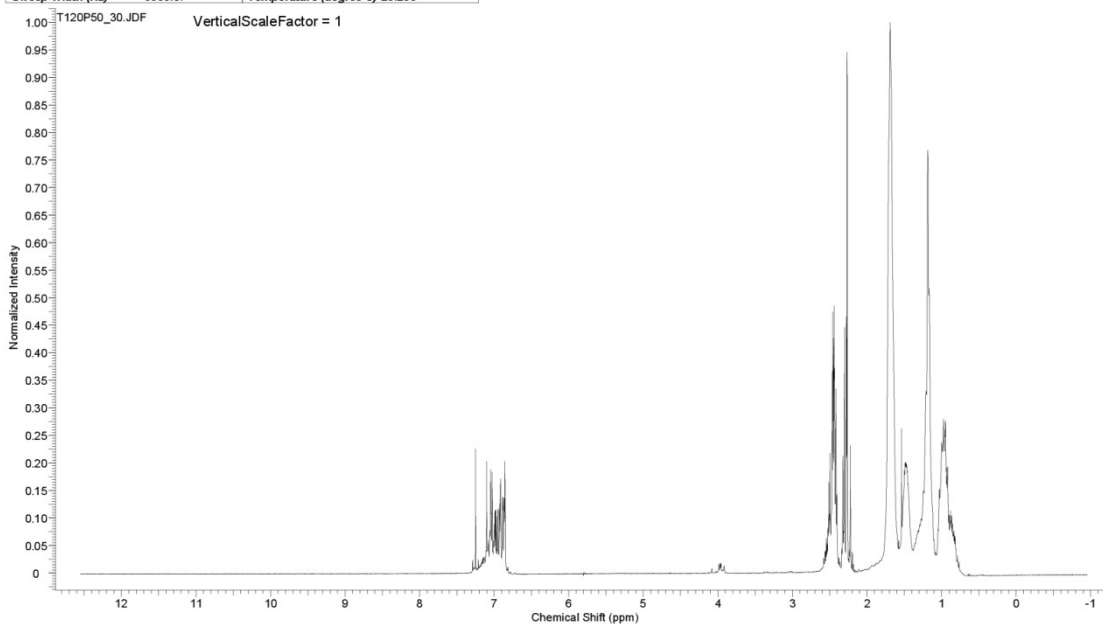


Figure S 16: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 30$ min ($T=120^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% $\text{Ru}/\text{Al}_2\text{O}_3$; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

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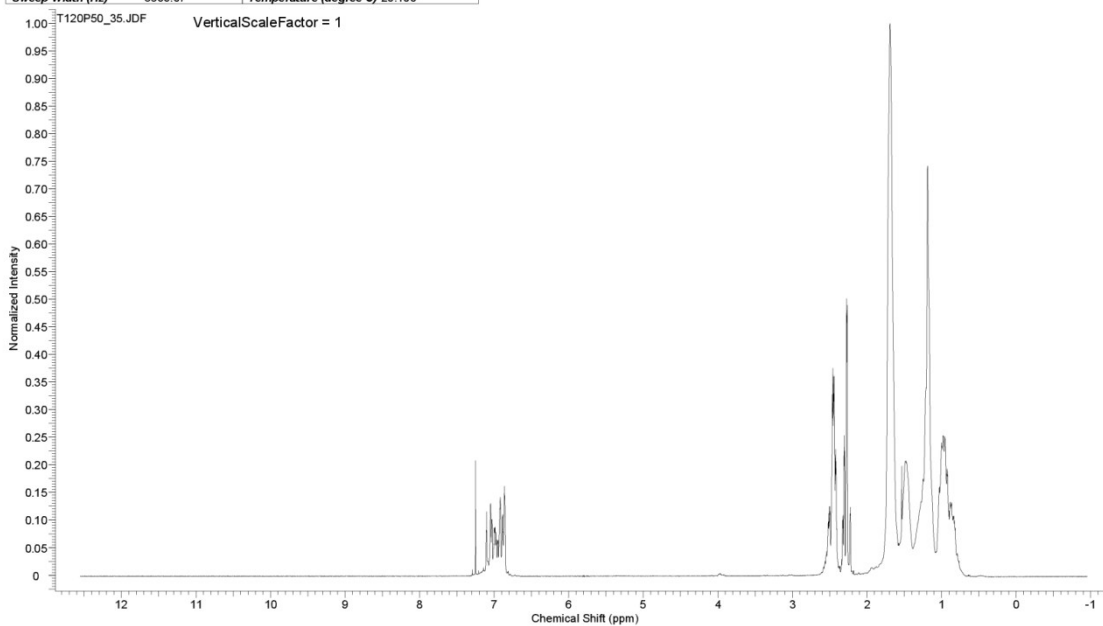


Figure S 17: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 35$ min ($T=120^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% $\text{Ru}/\text{Al}_2\text{O}_3$; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

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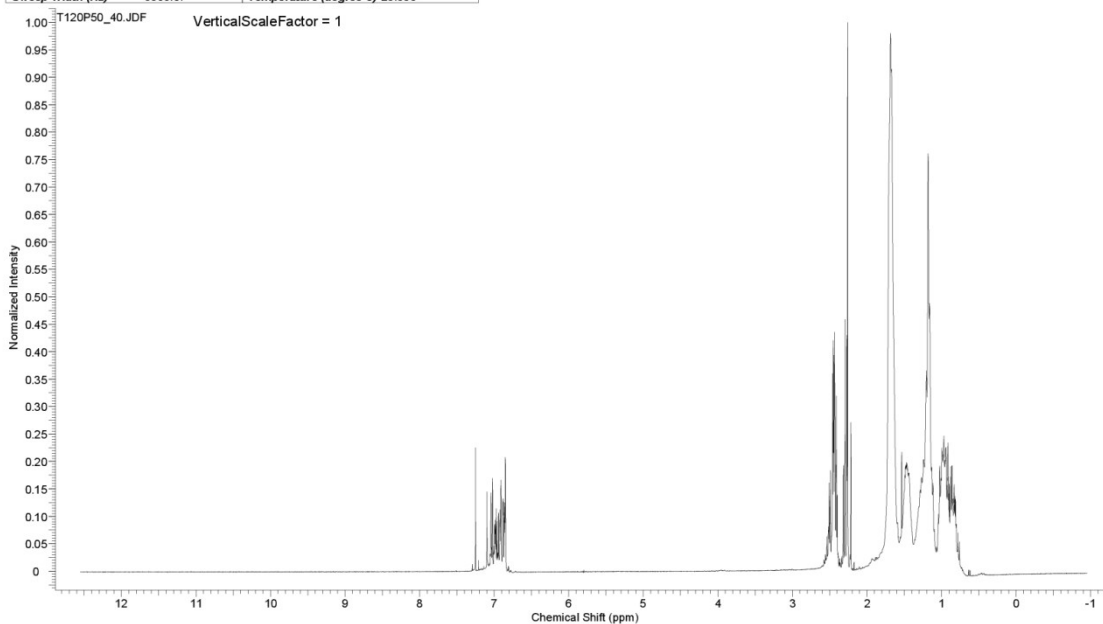


Figure S 18: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 40$ min ($T=120^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

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Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	34.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	20.100	Spectrum Type	STANDARD

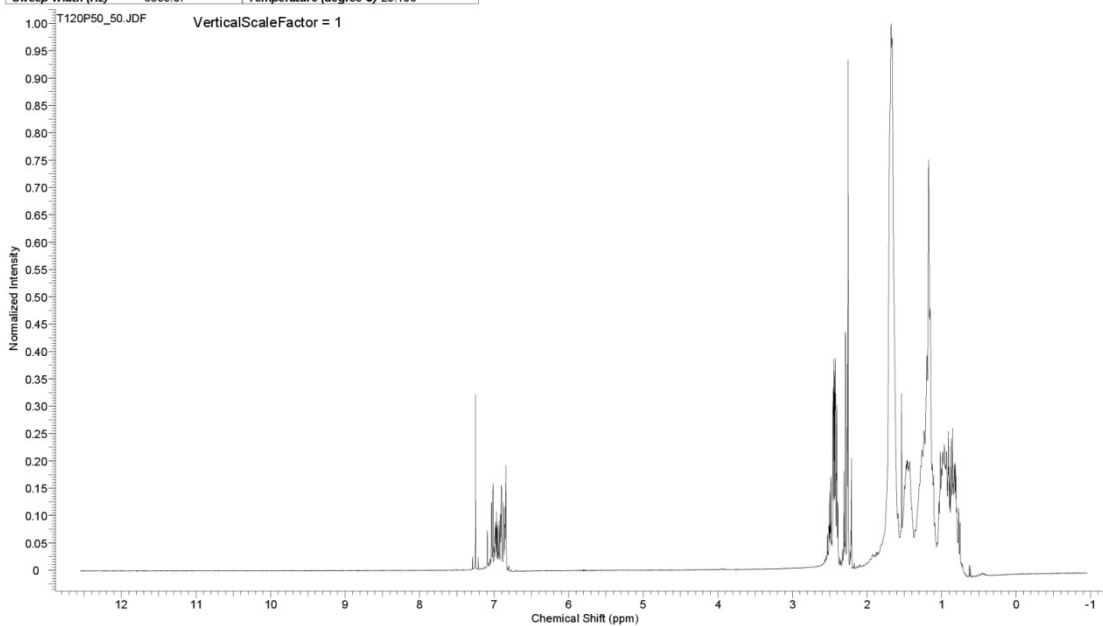


Figure S 19: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 50$ min ($T=120^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 20:43:26

Acquisition Time (sec)	2.4276	Date	19 Nov 2013 01:14:18	Date Stamp	19 Nov 2013 00:20:01
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Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	20.000	Spectrum Type	STANDARD

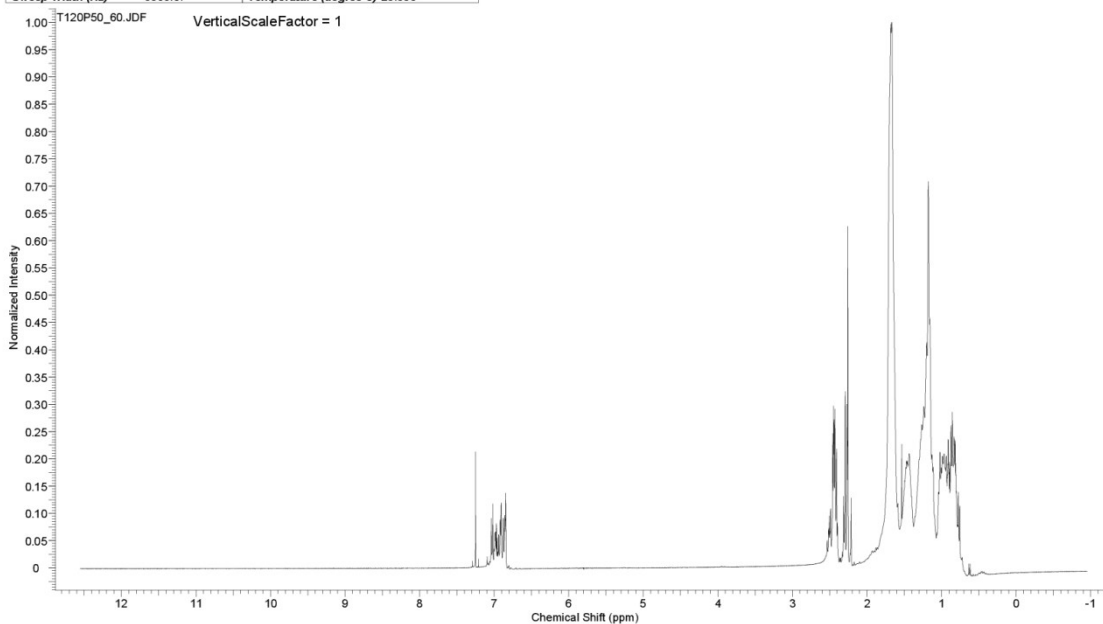


Figure S 20: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 60$ min ($T=120^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

03.01.2016 20:43:33

Acquisition Time (sec)	2.4276	Date	19 Nov 2013 02:40:52	Date Stamp	19 Nov 2013 01:46:36
File Name	D:\PAPER_3010\SUPPORTINGINFORMATION\EXPERIMENTAL-DATA\T120P50\T120P50_90.JDF	Frequency (MHz)	399.78	Original Points Count	13107
Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	20.000	Spectrum Type	STANDARD

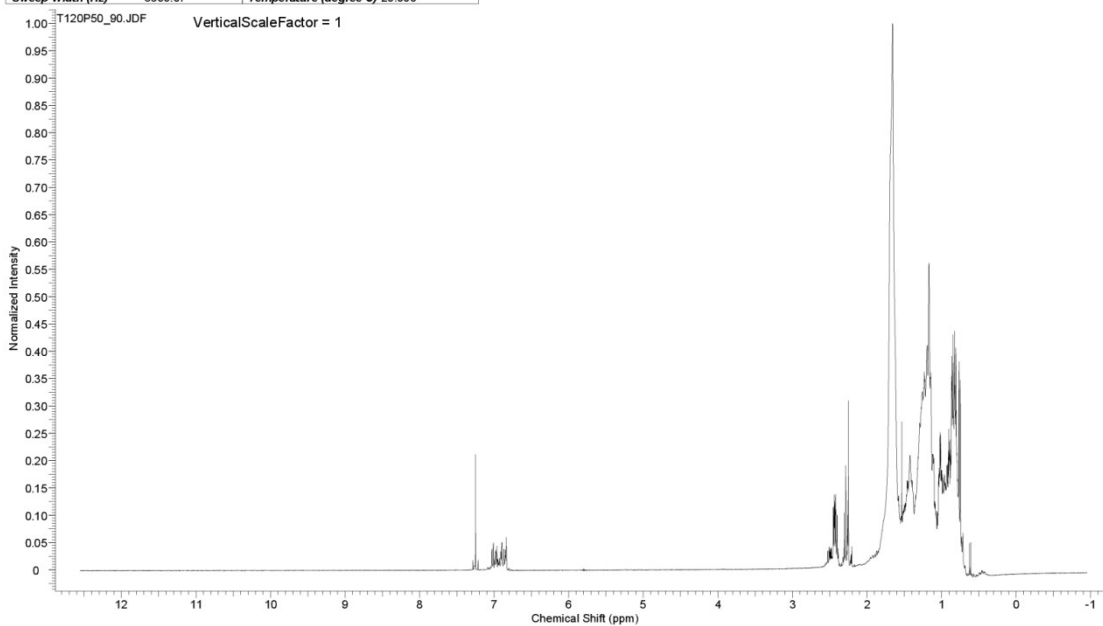


Figure S 21: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 90$ min ($T=120^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

03.01.2016 20:43:50

Acquisition Time (sec)	2.4276	Date	19 Nov 2013 02:30:18	Date Stamp	19 Nov 2013 01:36:02
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Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	20.100	Spectrum Type	STANDARD

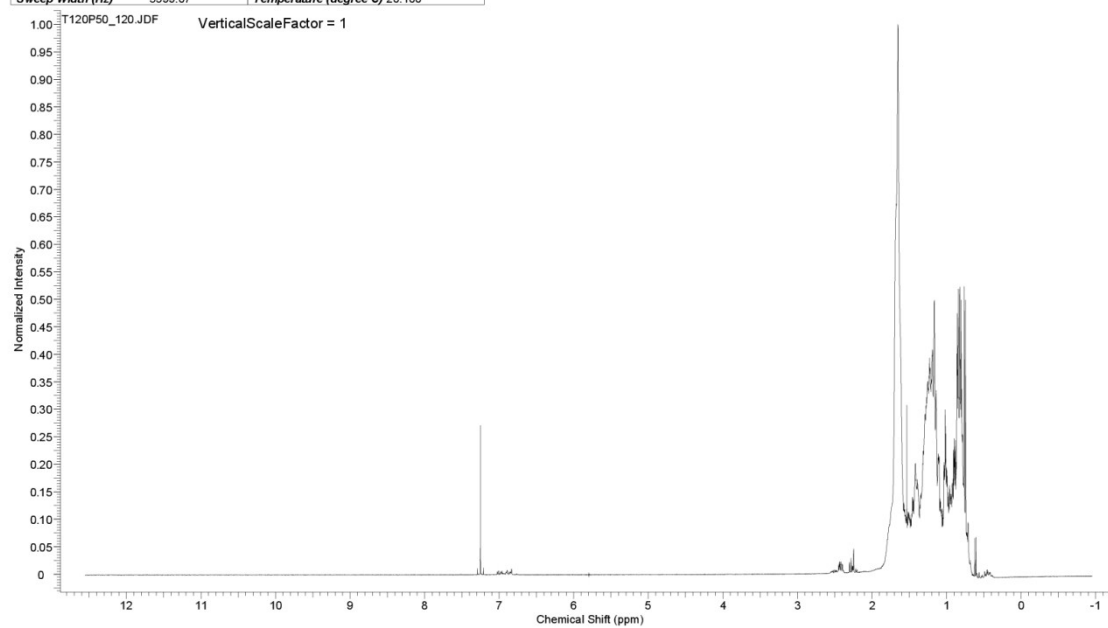


Figure S 22: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 120$ min ($T=120^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H}_0\text{-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

T = 140 °C ; P = 50 bar

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03.01.2016 21:03:50

Acquisition Time (sec)	2.4276	Date	14 Nov 2013 16:15:21	Date Stamp	14 Nov 2013 15:21:08
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Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	19.400	Spectrum Type	STANDARD

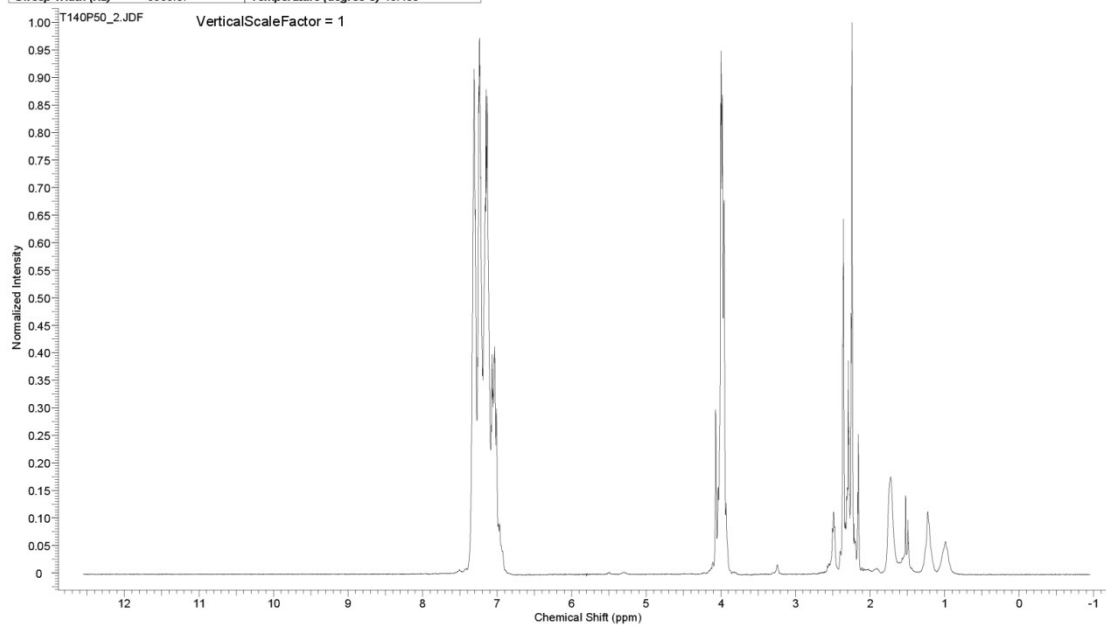


Figure S 23: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 2$ min (T=140°C; P=50 bar; Cat.: 0.5 wt% Ru/Al₂O₃; m[H₀-DBT] = 150g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:04:06

Acquisition Time (sec)	2.4276	Date	14 Nov 2013 15:23:29	Date Stamp	14 Nov 2013 14:29:16
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Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	19.500	Spectrum Type	STANDARD

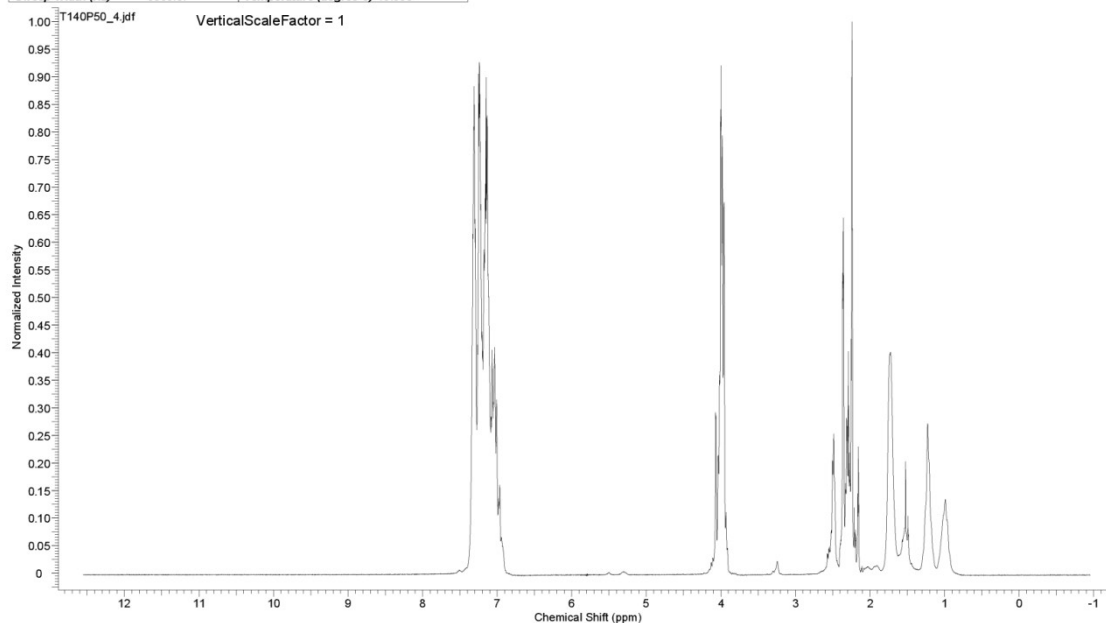


Figure S 24: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 4$ min (T=140°C; P=50 bar; Cat.: 0.5 wt% Ru/Al₂O₃; m[H₀-DBT] = 150g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:04:15

Acquisition Time (sec)	2.4276	Date	14 Nov 2013 15:17:45	Date Stamp	14 Nov 2013 14:23:32
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Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse_ex2
Solvent	CHLOROFORM-d	Temperature (degree C)	19.300	Spectrum Offset (Hz)	2318.7368
Sweep Width (Hz)	5399.07			Receiver Gain	30.00
				Spectrum Type	STANDARD

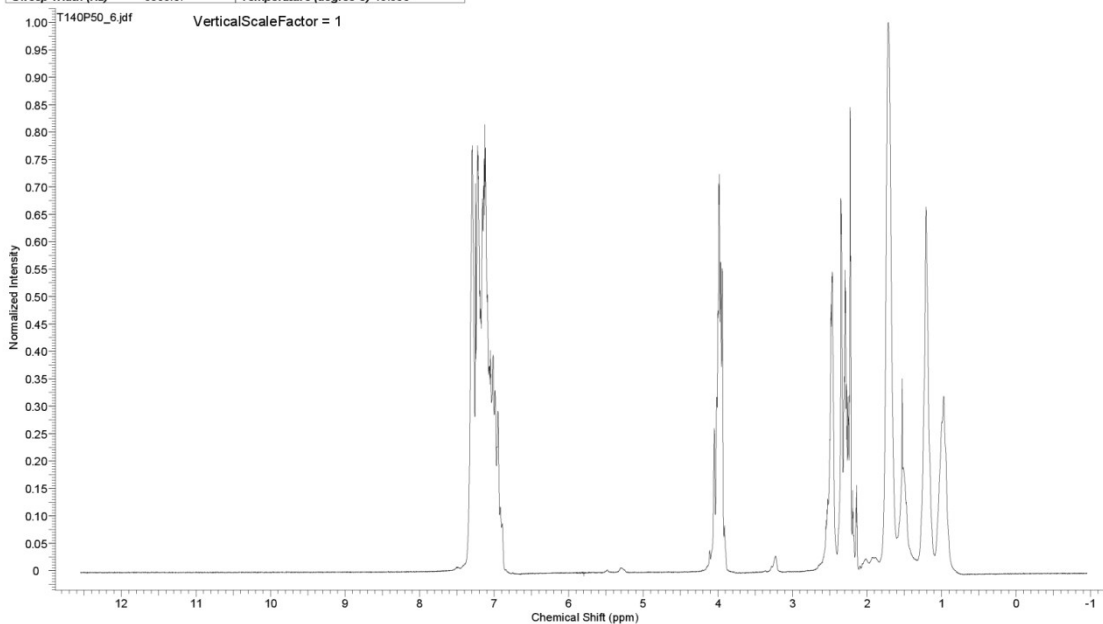


Figure S 25: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 6$ min ($T=140^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H}_0\text{-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

03.01.2016 21:04:25

Acquisition Time (sec)	2.4276	Date	14 Nov 2013 15:28:43	Date Stamp	14 Nov 2013 14:34:30
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Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse_ex2
Solvent	CHLOROFORM-d	Temperature (degree C)	19.400	Spectrum Offset (Hz)	2318.7368
Sweep Width (Hz)	5399.07			Receiver Gain	30.00
				Spectrum Type	STANDARD

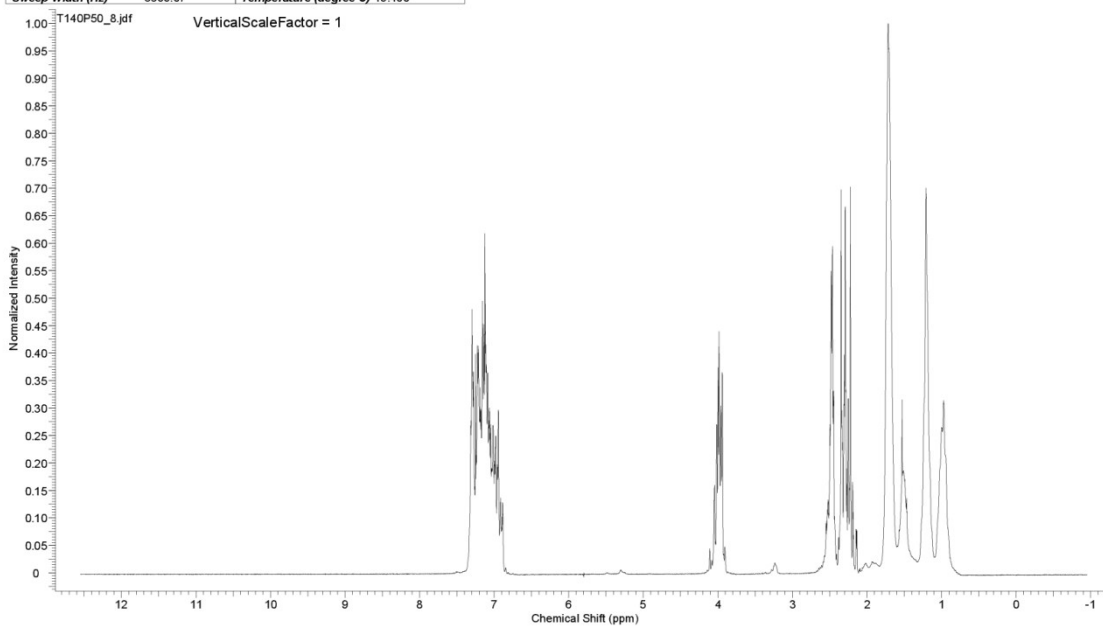


Figure S 26: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 8$ min ($T=140^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H}_0\text{-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:04:34

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Nucleus	1H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	19.600	Spectrum Type	STANDARD

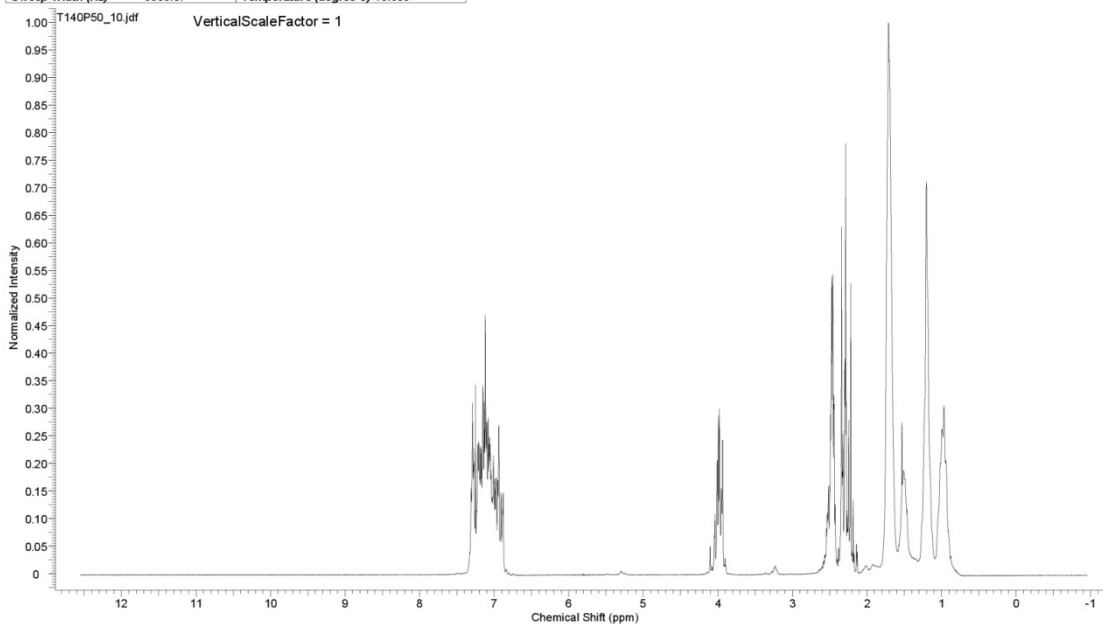


Figure S 27: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 10$ min ($T=140^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

03.01.2016 21:04:42

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Nucleus	1H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	19.300	Spectrum Type	STANDARD

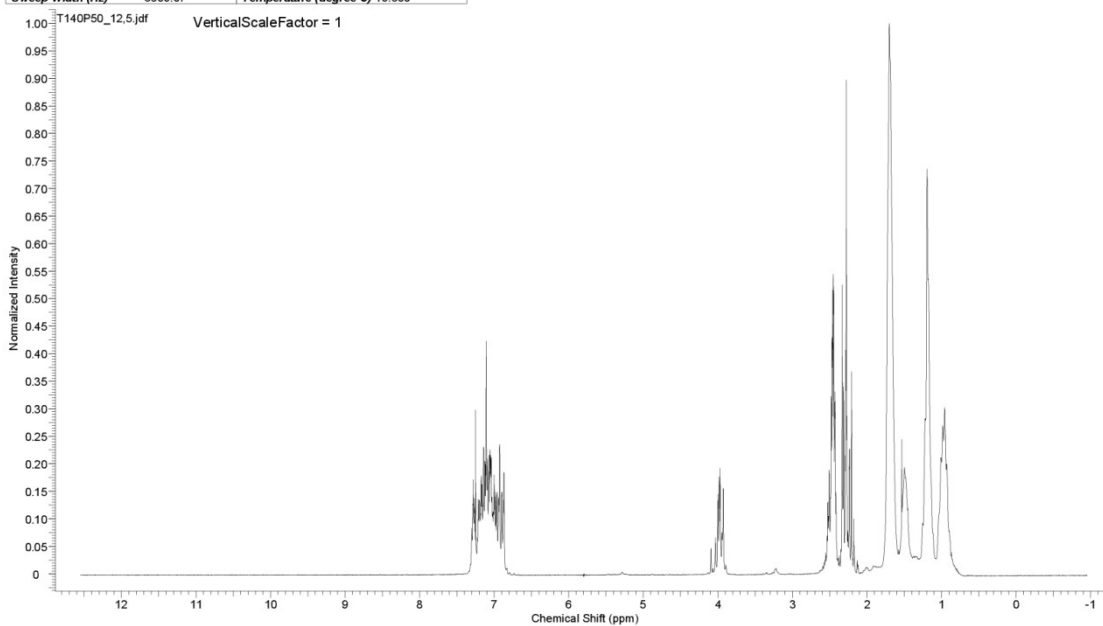


Figure S 28: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 12.5$ min ($T=140^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:04:56

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Nucleus	1H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	19.400	Spectrum Type	STANDARD

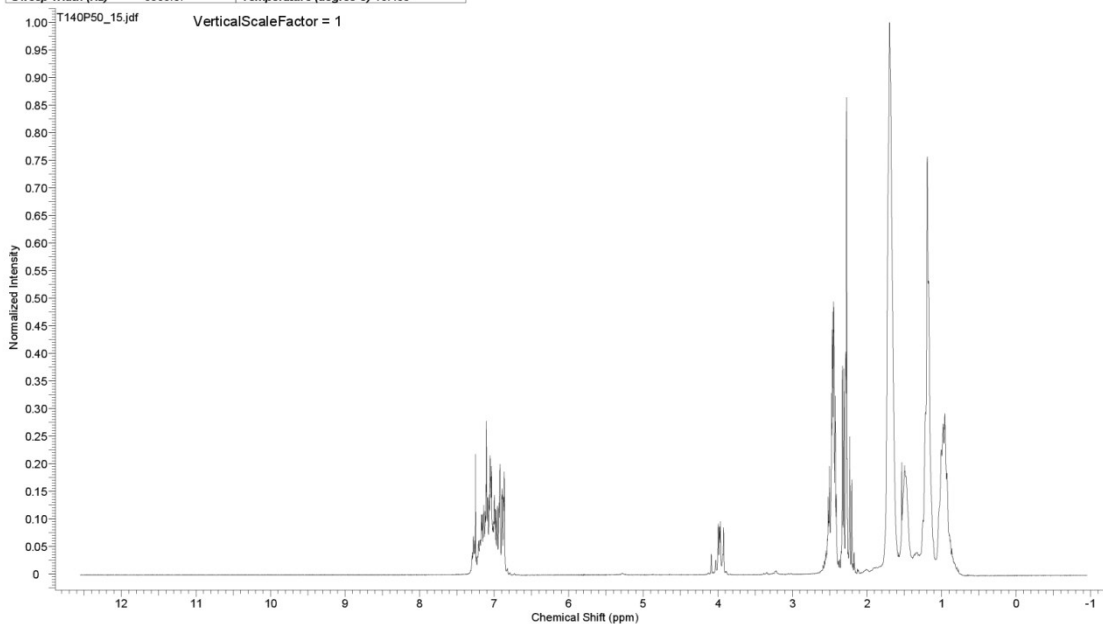


Figure S 29: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 15$ min ($T=140^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% $\text{Ru}/\text{Al}_2\text{O}_3$; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrprocl/

03.01.2016 21:05:07

Acquisition Time (sec)	2.4276	Date	14 Nov 2013 16:04:52	Date Stamp	14 Nov 2013 15:10:39
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Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	19.500	Spectrum Type	STANDARD

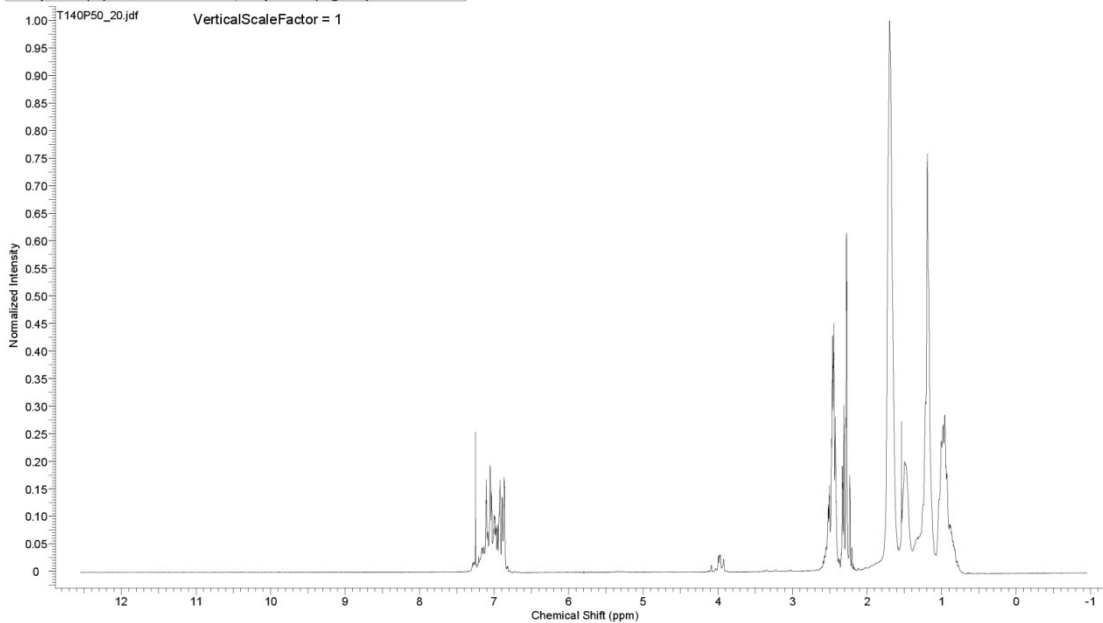


Figure S 30: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 20$ min ($T=140^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% $\text{Ru}/\text{Al}_2\text{O}_3$; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:05:22

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Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	19.500	Spectrum Type	STANDARD

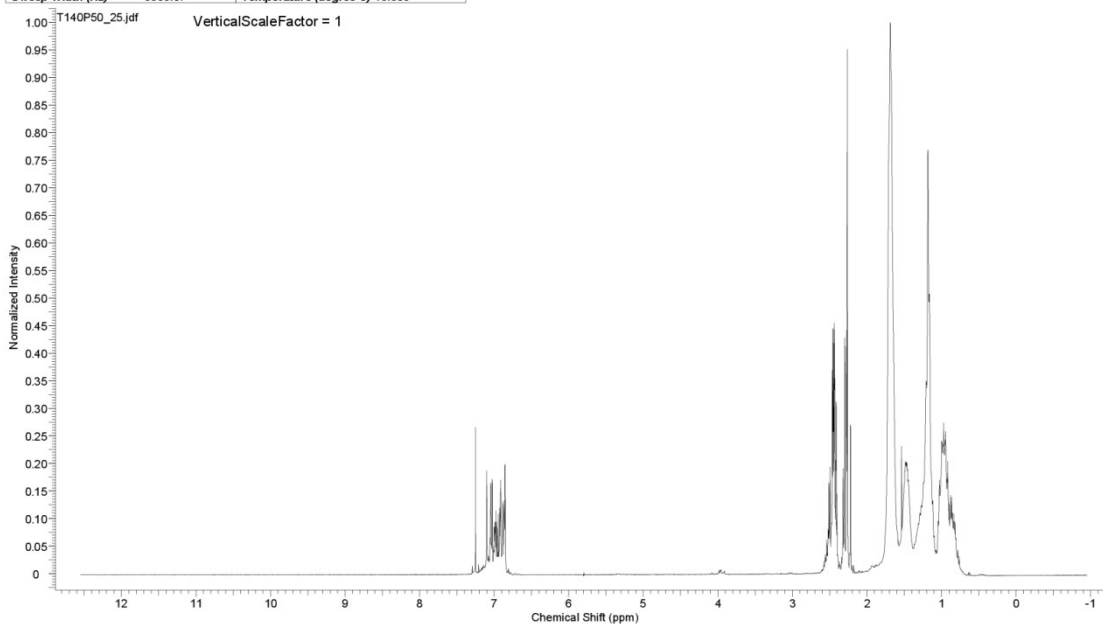


Figure S 31: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 25$ min ($T=140^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

03.01.2016 21:05:32

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Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	19.300	Spectrum Type	STANDARD

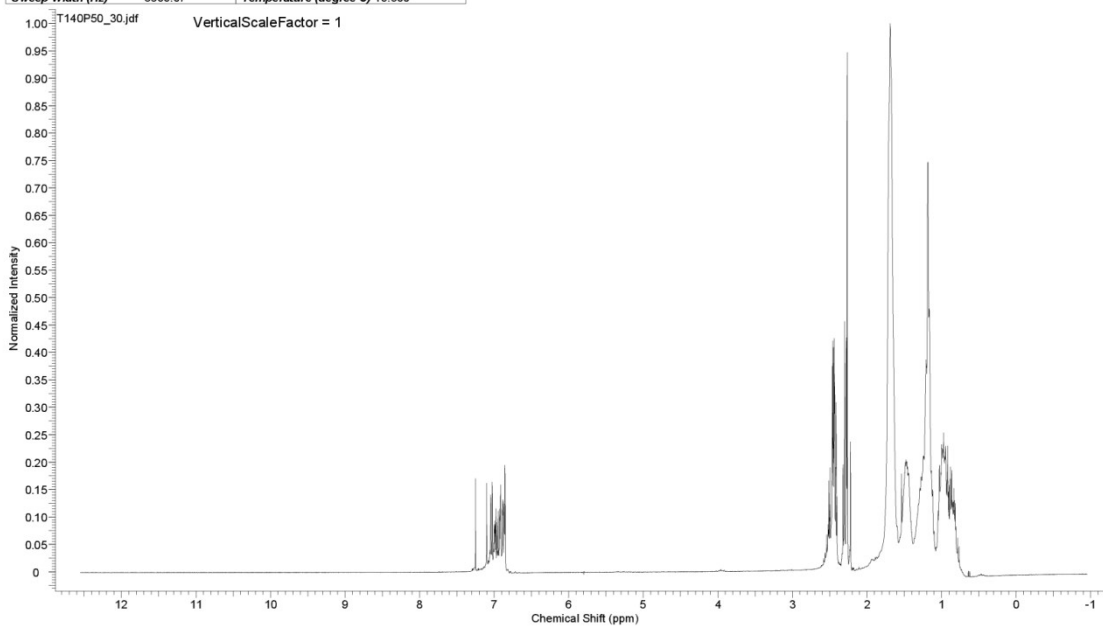


Figure S 32: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 30$ min ($T=140^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

03.01.2016 21:05:40

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Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse ex2
Solvent	CHLOROFORM-d	Temperature (degree C)	19.400	Spectrum Offset (Hz)	2318.7368
Sweep Width (Hz)	5399.07			Receiver Gain	30.00
				Spectrum Type	STANDARD

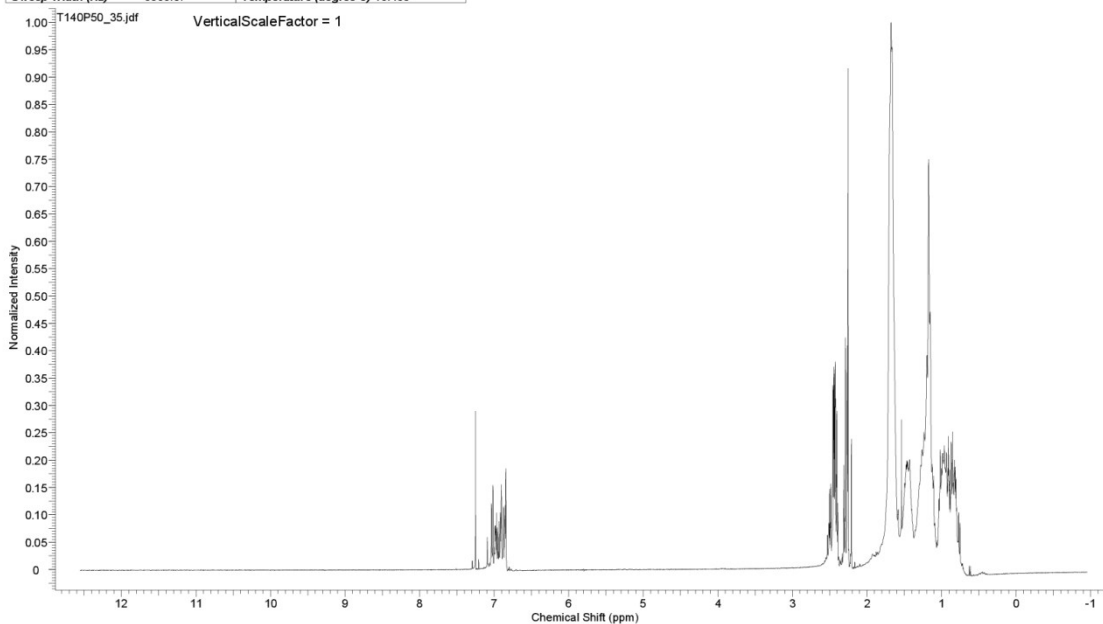


Figure S 33: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 35$ min ($T=140^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

03.01.2016 21:05:47

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Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse ex2
Solvent	CHLOROFORM-d	Temperature (degree C)	19.400	Spectrum Offset (Hz)	2318.7368
Sweep Width (Hz)	5399.07			Receiver Gain	30.00
				Spectrum Type	STANDARD

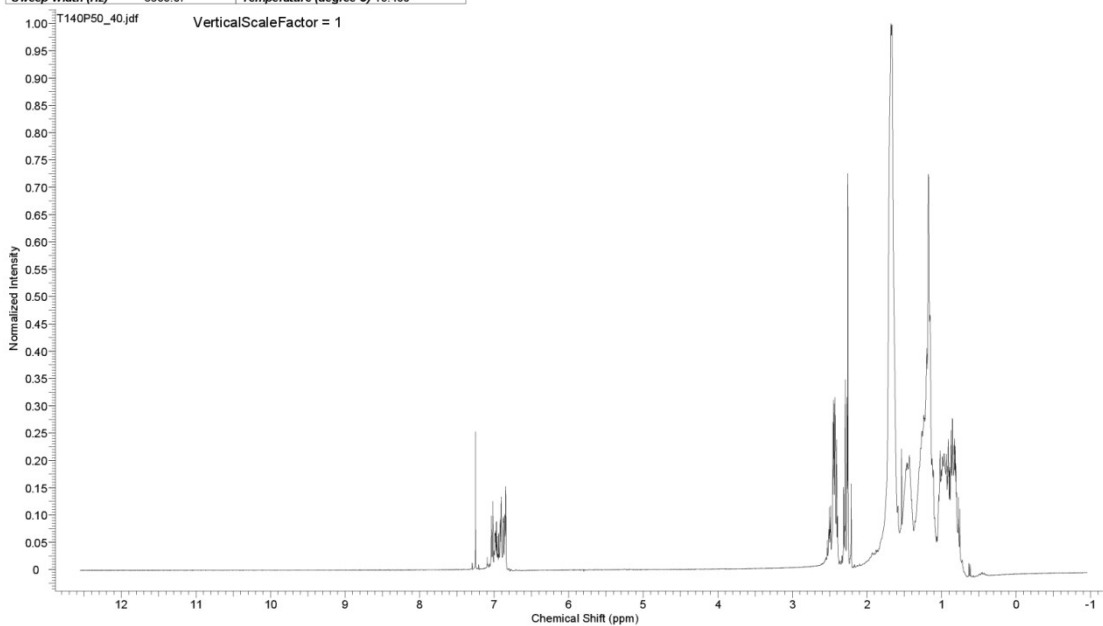


Figure S 34: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 40$ min ($T=140^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

03.01.2016 21:05:55

Acquisition Time (sec)	2.4276	Date	14 Nov 2013 15:54:42	Date Stamp	14 Nov 2013 15:00:29
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Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	19.300	Spectrum Type	STANDARD

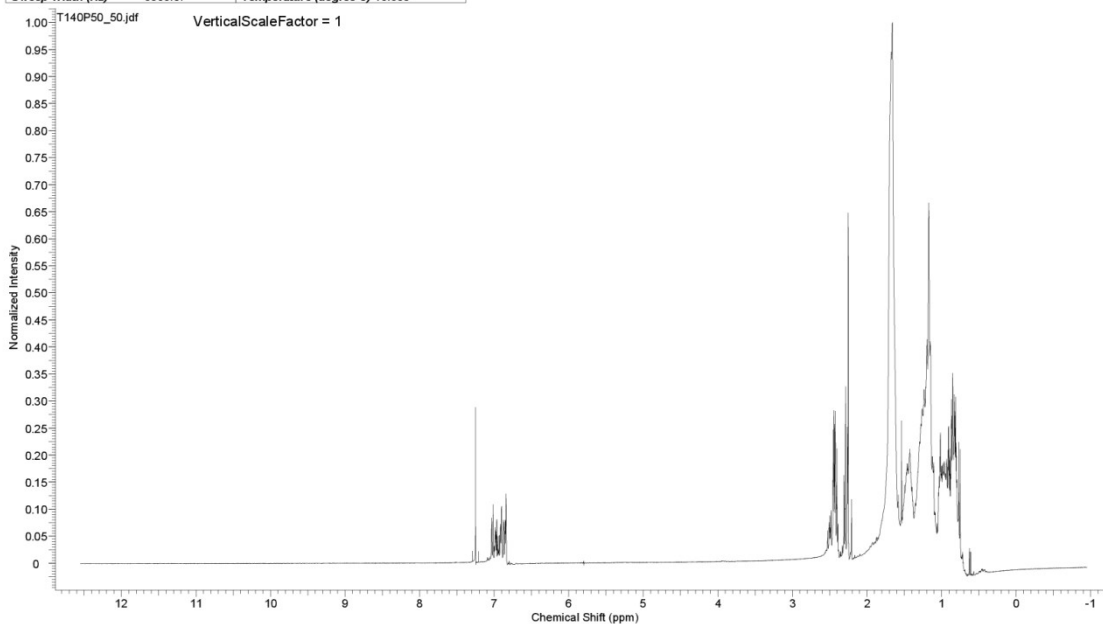


Figure S 35: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 50$ min ($T=140^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

03.01.2016 21:06:03

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Nucleus	1H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	28.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	19.500	Spectrum Type	STANDARD

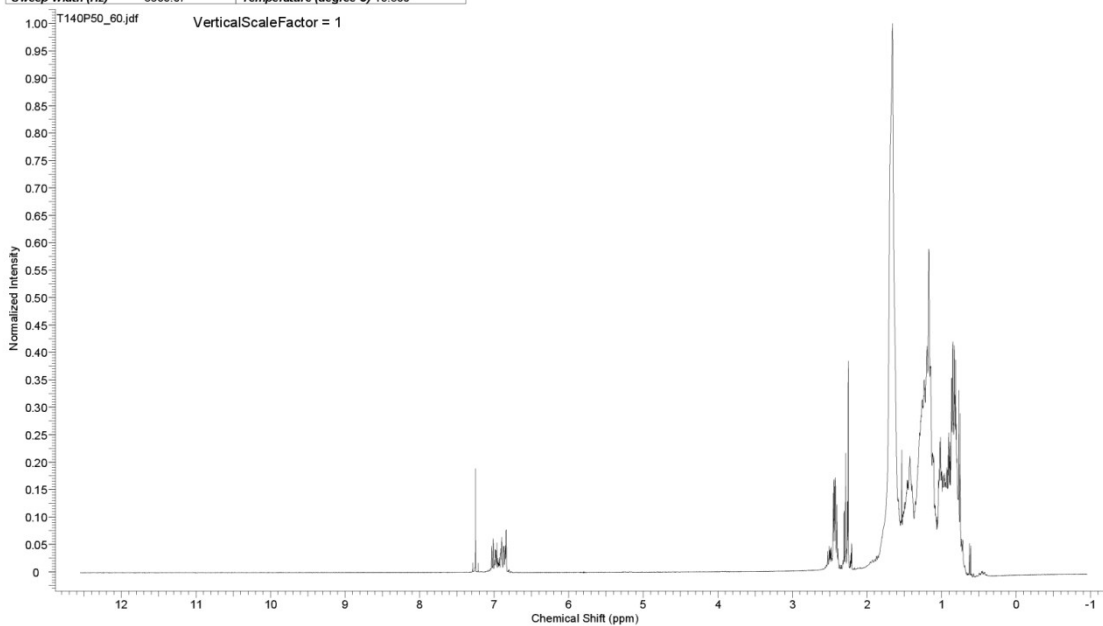


Figure S 36: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 60$ min ($T=140^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

03.01.2016 21:06:10

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Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	28.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	19.800	Spectrum Type	STANDARD

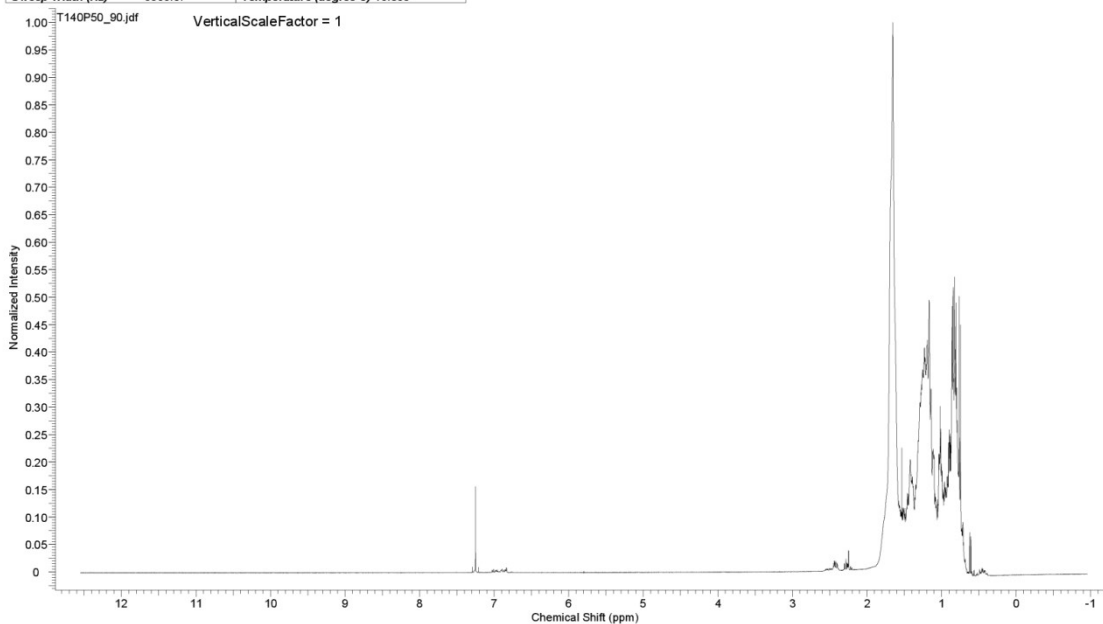


Figure S 37: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 90$ min ($T=140^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

03.01.2016 21:06:27

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Nucleus	1H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	26.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	19.700	Spectrum Type	STANDARD

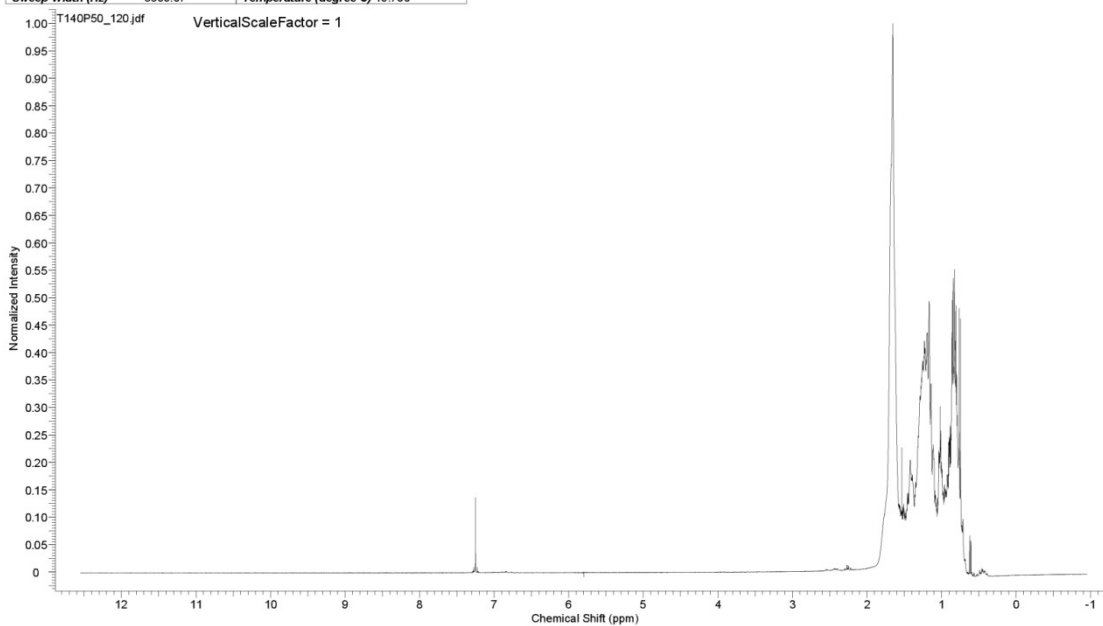


Figure S 38: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 120$ min ($T=140^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

T = 160 °C ; P = 50 bar

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03.01.2016 21:08:57

Acquisition Time (sec)	2.4276	Date	19 Nov 2013 15:49:41	Date Stamp	19 Nov 2013 14:55:25
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Nucleus	1H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	34.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	20.800	Spectrum Type	STANDARD

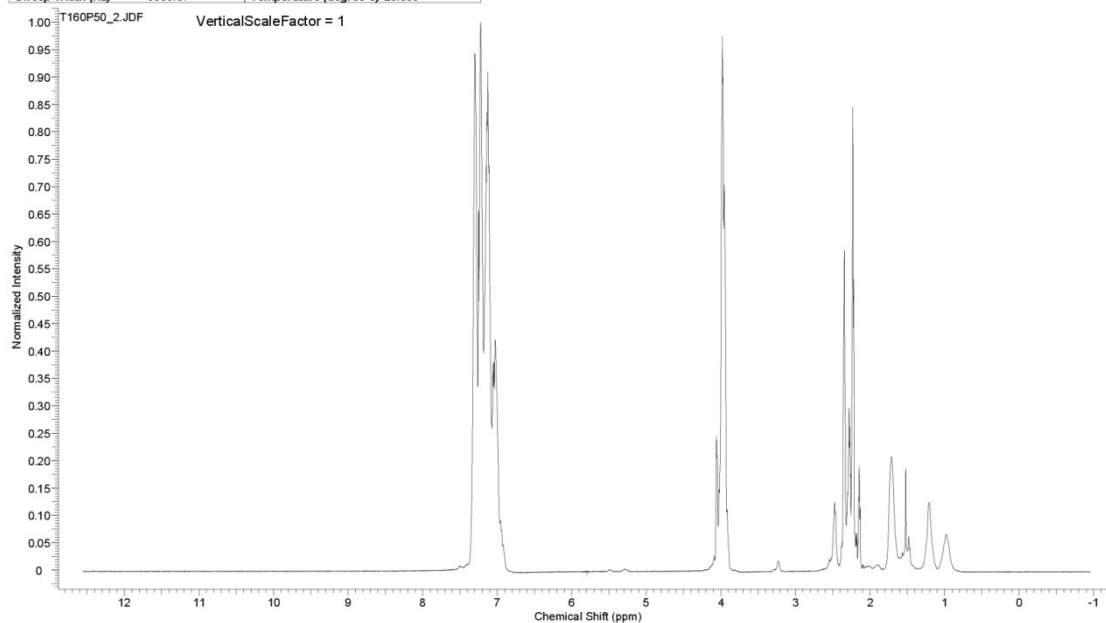


Figure S 39: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 2$ min (T=160°C; P=50 bar; Cat.: 0.5 wt% Ru/Al₂O₃; m[H₀-DBT] = 150g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:10:51

Acquisition Time (sec)	2.4276	Date	19 Nov 2013 15:44:11	Date Stamp	19 Nov 2013 14:49:56
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Nucleus	1H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	20.800	Spectrum Type	STANDARD

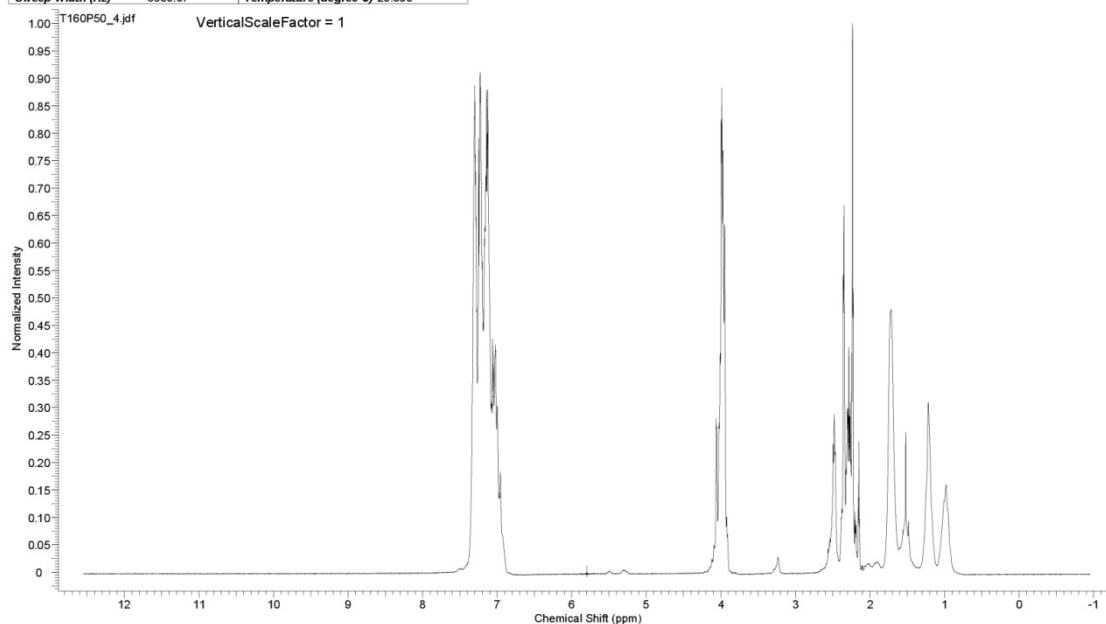


Figure S 40: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 4$ min (T=160°C; P=50 bar; Cat.: 0.5 wt% Ru/Al₂O₃; m[H₀-DBT] = 150g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

03.01.2016 21:11:00

Acquisition Time (sec)	2.4276	Date	19 Nov 2013 15:28:46	Date Stamp	19 Nov 2013 14:34:31
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T160P50\T160P50_6.jdf	Frequency (MHz)	399.78	Original Points Count	13107
Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	21.000	Spectrum Type	STANDARD

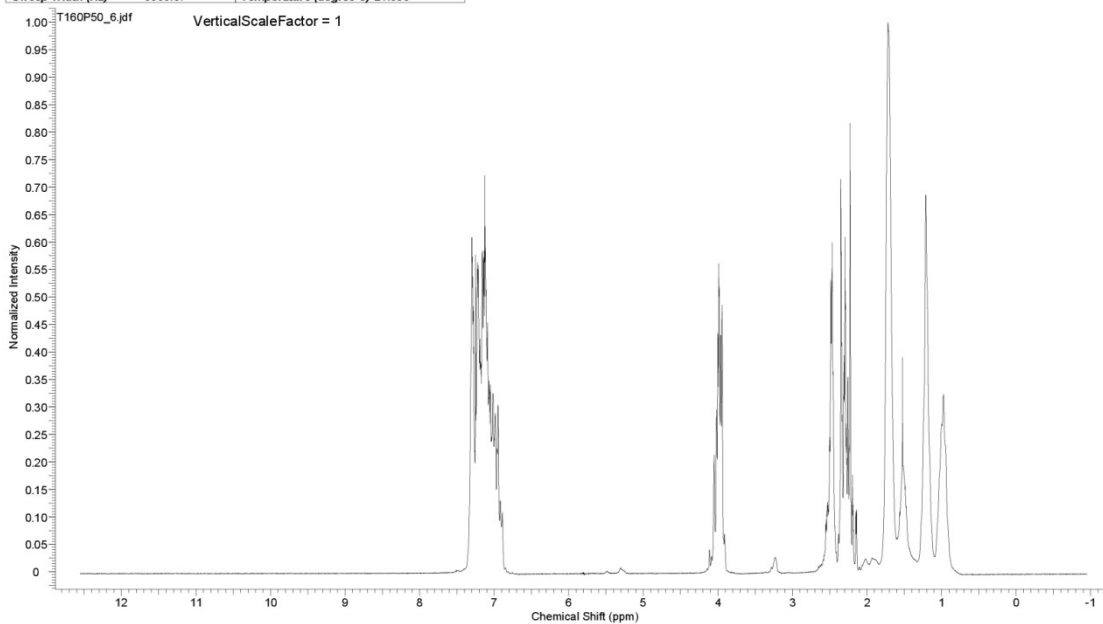


Figure S 41: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 6$ min ($T=160^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H}_0\text{-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

03.01.2016 21:11:08

Acquisition Time (sec)	2.4276	Date	19 Nov 2013 15:34:03	Date Stamp	19 Nov 2013 14:39:47
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T160P50\T160P50_8.jdf	Frequency (MHz)	399.78	Original Points Count	13107
Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	21.000	Spectrum Type	STANDARD

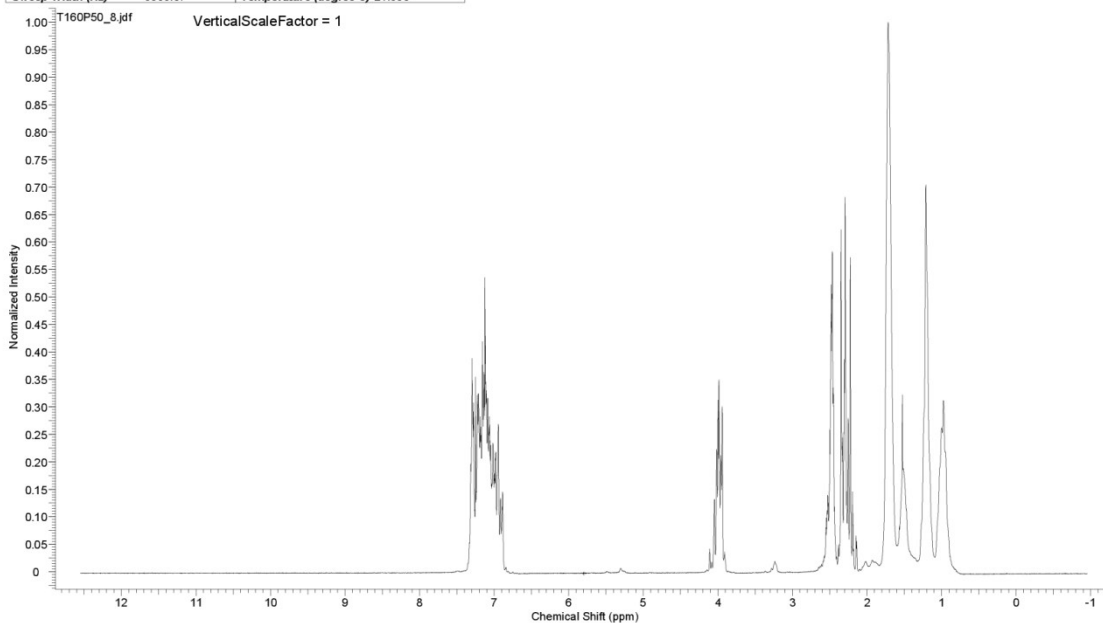


Figure S 42: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 8$ min ($T=160^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H}_0\text{-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

03.01.2016 21:09:09

Acquisition Time (sec)	2.4276	Date	19 Nov 2013 16:26:14	Date Stamp	19 Nov 2013 15:31:59
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T160P50\T160P50_10.jdf	Frequency (MHz)	399.78	Original Points Count	13107
Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse_ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	20.700	Spectrum Type	STANDARD

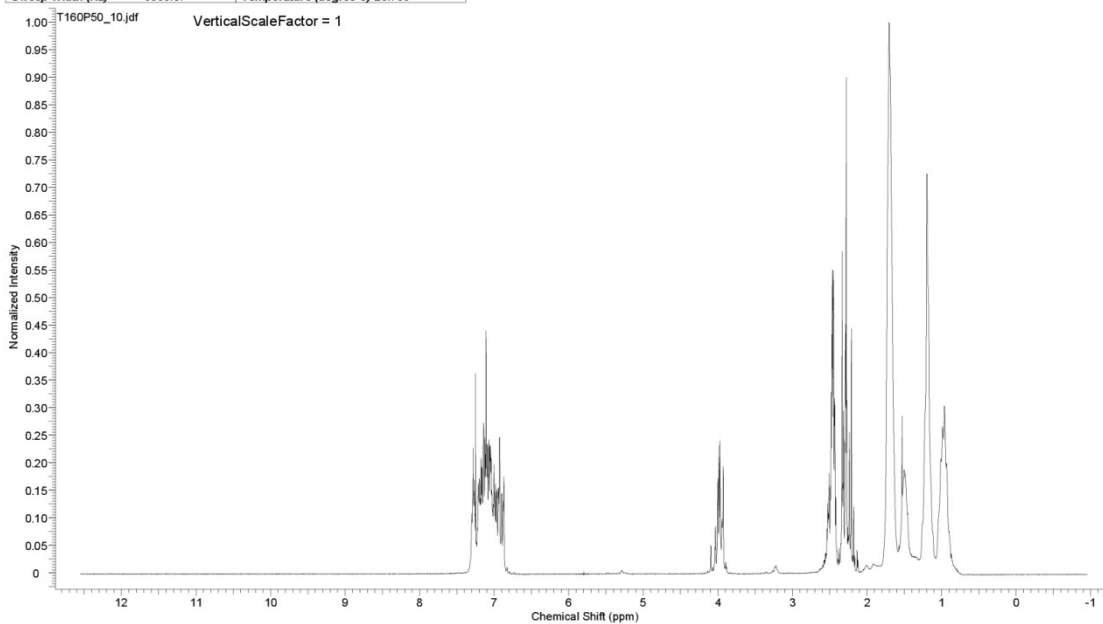


Figure S 43: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 10$ min ($T=160^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

03.01.2016 21:09:18

Acquisition Time (sec)	2.4276	Date	19 Nov 2013 16:21:07	Date Stamp	19 Nov 2013 15:26:52
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Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse_ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	20.700	Spectrum Type	STANDARD

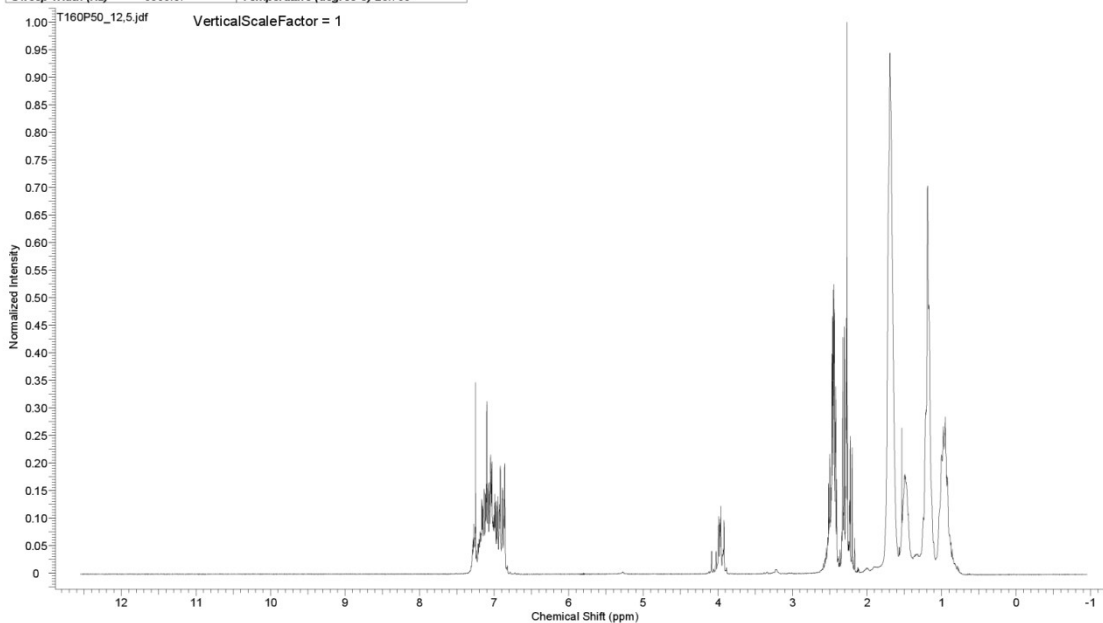


Figure S 44: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 12.5$ min ($T=160^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

03.01.2016 21:09:27

Acquisition Time (sec)	2.4276	Date	19 Nov 2013 16:00:00	Date Stamp	19 Nov 2013 15:05:44
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T160P50\T160P50_15.jdf	Frequency (MHz)	399.78	Original Points Count	13107
Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	20.800	Spectrum Type	STANDARD

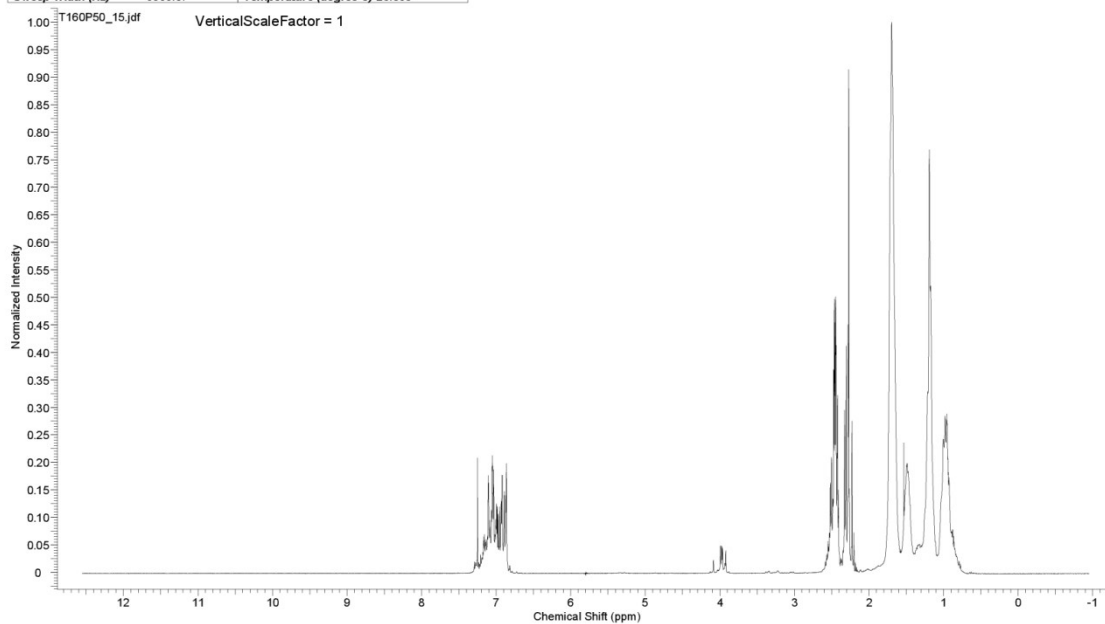


Figure S 45: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 15$ min ($T=160^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H}_0\text{-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:09:36

Acquisition Time (sec)	2.4276	Date	19 Nov 2013 16:05:21	Date Stamp	19 Nov 2013 15:11:06
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T160P50\T160P50_20.jdf	Frequency (MHz)	399.78	Original Points Count	13107
Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	20.800	Spectrum Type	STANDARD

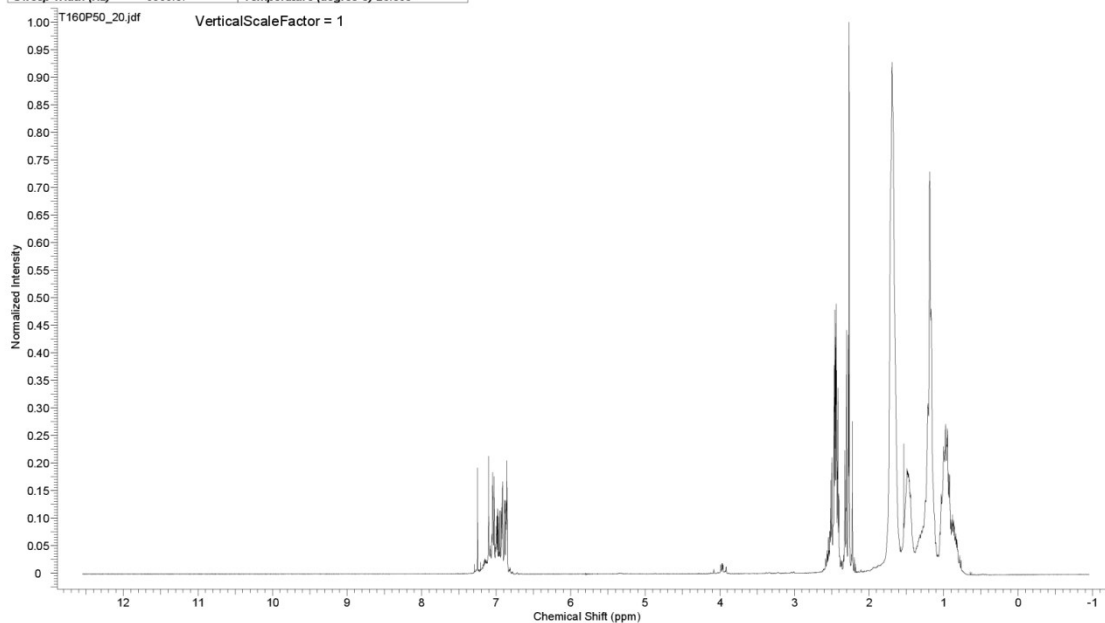


Figure S 46: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 20$ min ($T=160^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H}_0\text{-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:09:45

Acquisition Time (sec)	2.4276	Date	19 Nov 2013 16:10:47	Date Stamp	19 Nov 2013 15:16:31
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T160P50\T160P50_25.jdf	Frequency (MHz)	399.78	Original Points Count	13107
Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Temperature (degree C)	20.700	Spectrum Offset (Hz)	2318.7368
Sweep Width (Hz)	5399.07			Receiver Gain	30.00
				Spectrum Type	STANDARD

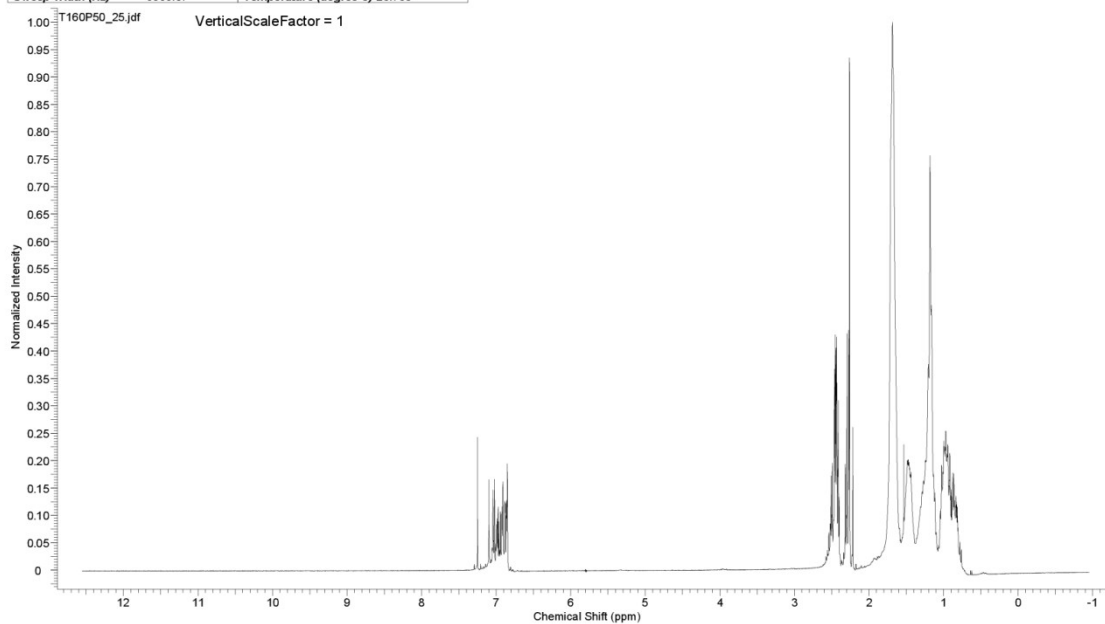


Figure S 47: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 25$ min ($T=160^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H}_0\text{-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:09:53

Acquisition Time (sec)	2.4276	Date	19 Nov 2013 16:16:00	Date Stamp	19 Nov 2013 15:21:44
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T160P50\T160P50_30.jdf	Frequency (MHz)	399.78	Original Points Count	13107
Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Temperature (degree C)	20.700	Spectrum Offset (Hz)	2318.7368
Sweep Width (Hz)	5399.07			Receiver Gain	30.00
				Spectrum Type	STANDARD

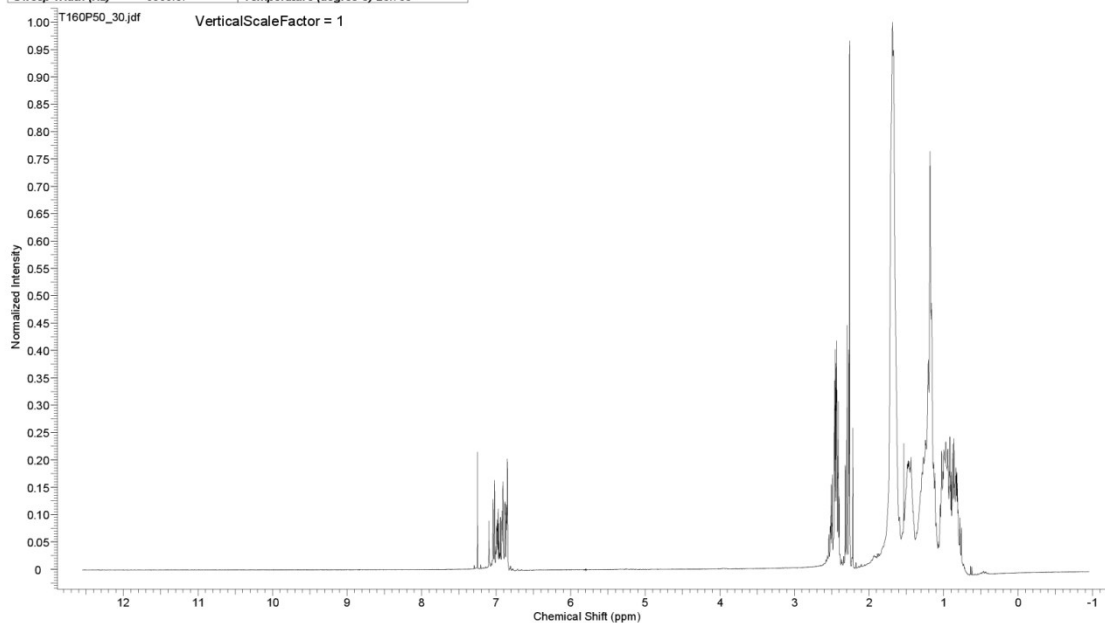


Figure S 48: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 30$ min ($T=160^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H}_0\text{-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

03.01.2016 21:10:00

Acquisition Time (sec)	2.4276	Date	19 Nov 2013 15:23:45	Date Stamp	19 Nov 2013 14:29:30
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T160P50\T160P50_35.jdf	Frequency (MHz)	399.78	Original Points Count	13107
Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse_ex2
Solvent	CHLOROFORM-d	Temperature (degree C)	21.100	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Spectrum Offset (Hz)	2318.7368	Spectrum Type	STANDARD

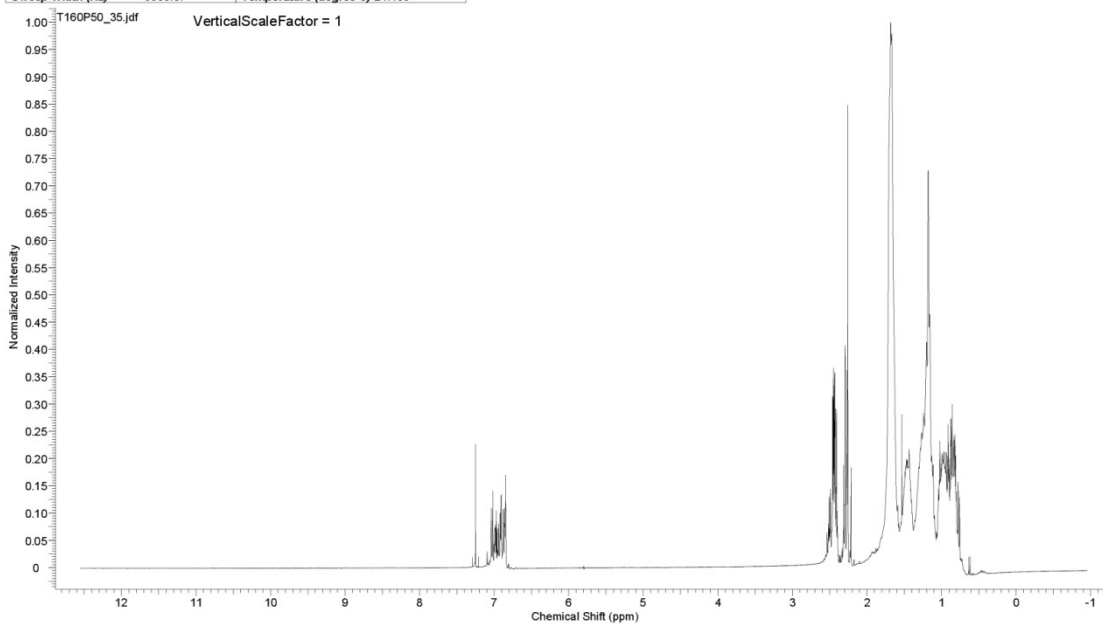


Figure S 49: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 35$ min ($T=160^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% $\text{Ru}/\text{Al}_2\text{O}_3$; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

03.01.2016 21:10:12

Acquisition Time (sec)	2.4276	Date	19 Nov 2013 16:34:54	Date Stamp	19 Nov 2013 15:40:38
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Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse_ex2
Solvent	CHLOROFORM-d	Temperature (degree C)	20.700	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Spectrum Offset (Hz)	2318.7368	Spectrum Type	STANDARD

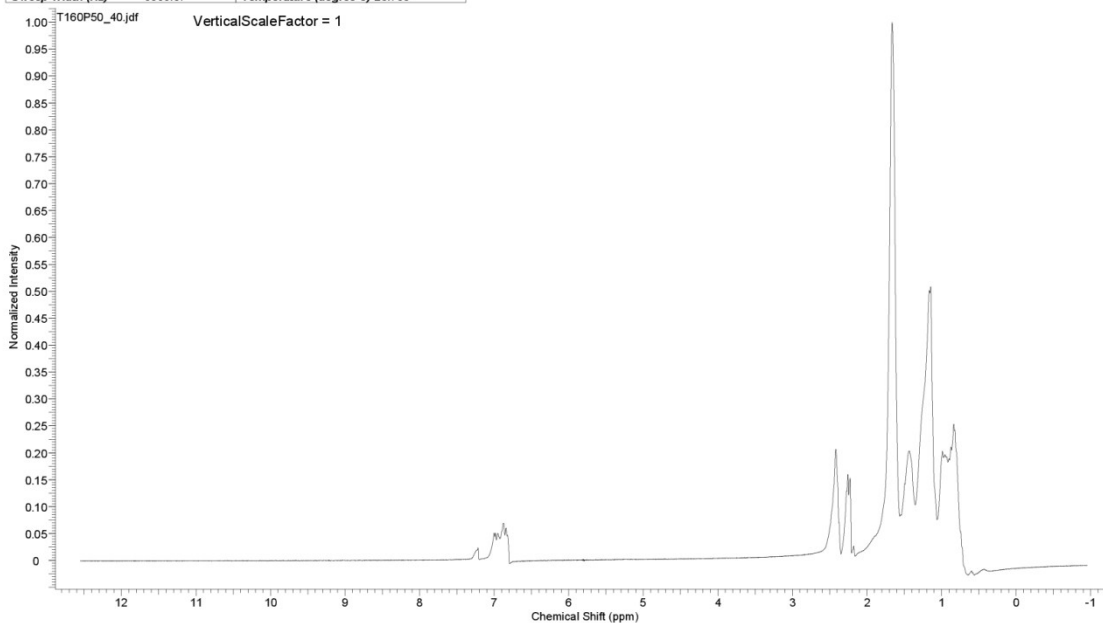


Figure S 50: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 40$ min ($T=160^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% $\text{Ru}/\text{Al}_2\text{O}_3$; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

03.01.2016 21:10:20

Acquisition Time (sec)	2.4276	Date	19 Nov 2013 15:39:03	Date Stamp	19 Nov 2013 14:44:48
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Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Temperature (degree C)	20.900	Spectrum Offset (Hz)	2318.7368
Sweep Width (Hz)	5399.07			Spectrum Type	STANDARD

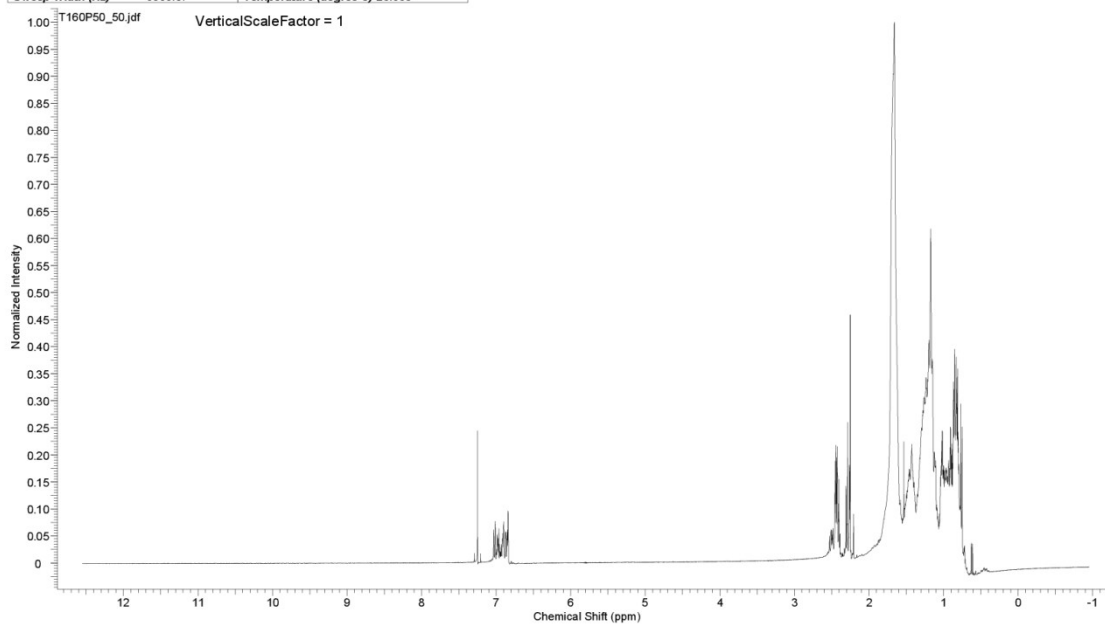


Figure S 51: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 50$ min ($T=160^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% $\text{Ru}/\text{Al}_2\text{O}_3$; $m[\text{H}_0\text{-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

03.01.2016 21:10:27

Acquisition Time (sec)	2.4276	Date	19 Nov 2013 16:31:09	Date Stamp	19 Nov 2013 15:36:53
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T160P50\T160P50_60.jdf	Frequency (MHz)	399.78	Original Points Count	13107
Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Temperature (degree C)	20.700	Spectrum Offset (Hz)	2318.7368
Sweep Width (Hz)	5399.07			Spectrum Type	STANDARD

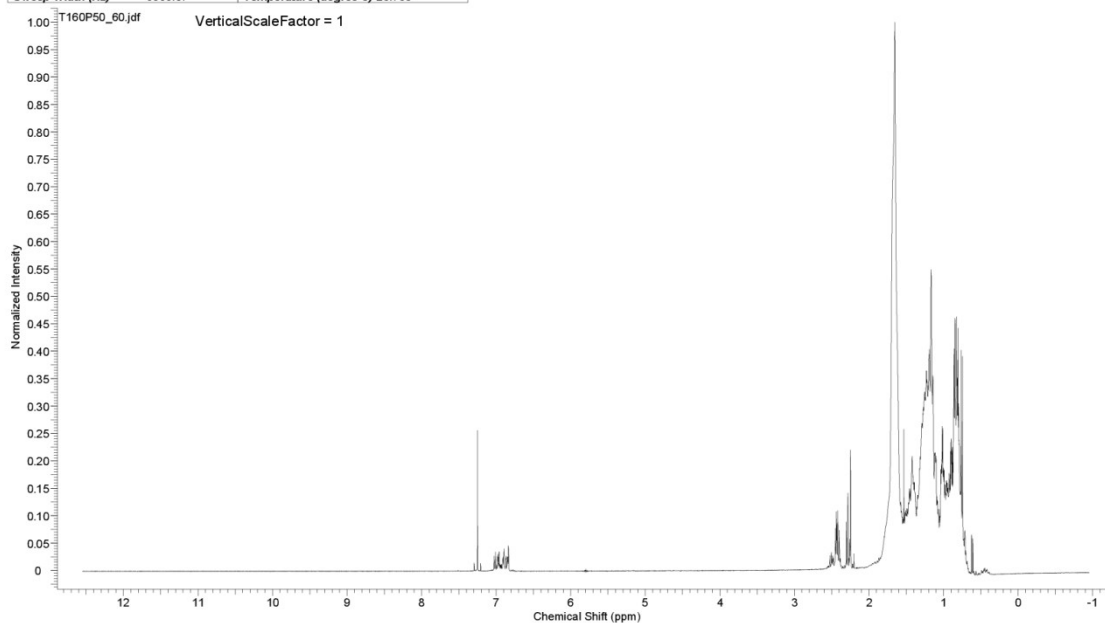


Figure S 52: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 60$ min ($T=160^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% $\text{Ru}/\text{Al}_2\text{O}_3$; $m[\text{H}_0\text{-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:10:34

Acquisition Time (sec)	2.4276	Date	20 Nov 2013 02:17:15	Date Stamp	20 Nov 2013 01:22:59
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Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Temperature (degree C)	20.900	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Spectrum Offset (Hz)	2318.7368	Spectrum Type	STANDARD

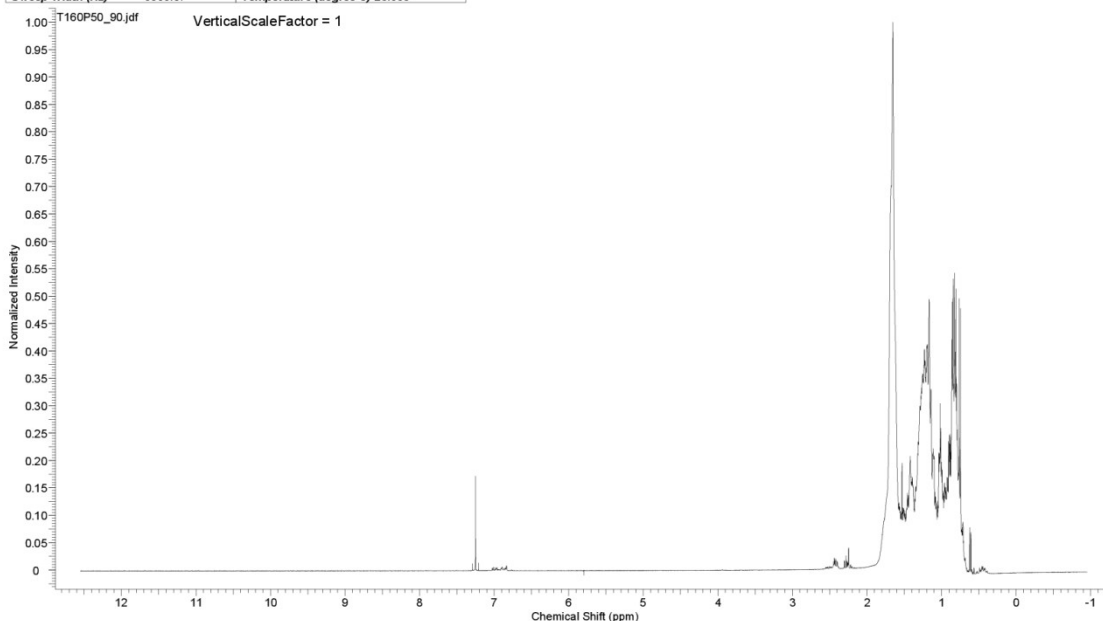


Figure S 53: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 90$ min ($T=160^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

03.01.2016 21:10:41

Acquisition Time (sec)	2.4276	Date	20 Nov 2013 02:12:14	Date Stamp	20 Nov 2013 01:17:58
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T160P50\T160P50_120.jdf	Frequency (MHz)	399.78	Original Points Count	13107
Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Temperature (degree C)	21.000	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Spectrum Offset (Hz)	2318.7368	Spectrum Type	STANDARD

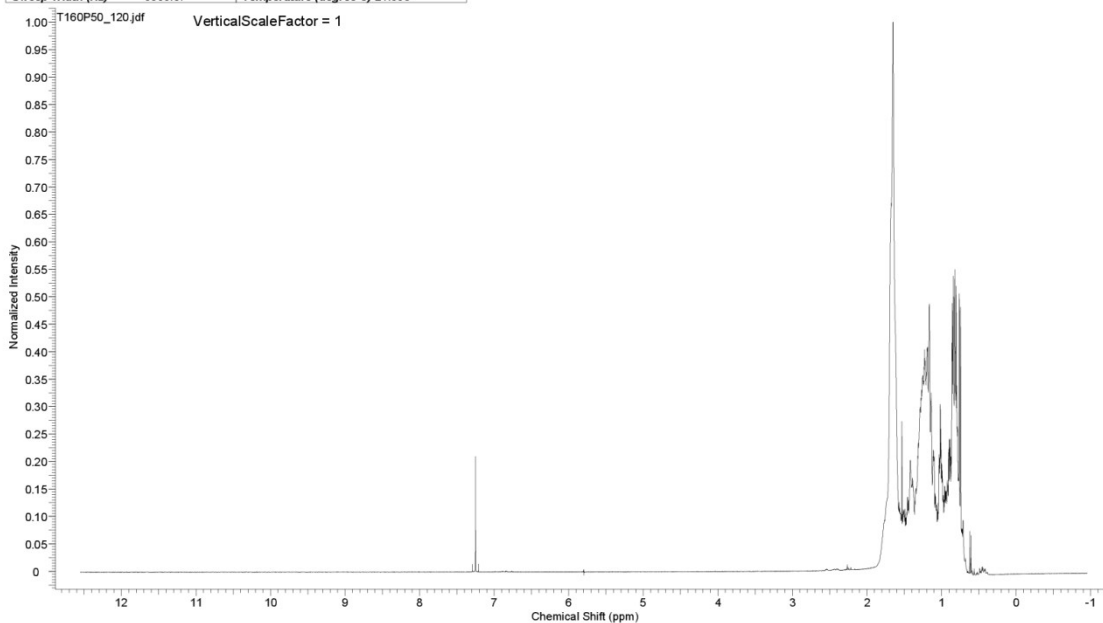


Figure S 54: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 120$ min ($T=160^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

T = 180 °C ; P = 50 bar

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

03.01.2016 21:13:58

Acquisition Time (sec)	2.4276	Date	21 Nov 2013 01:34:24	Date Stamp	21 Nov 2013 00:40:08
File Name	D:\PAPER_3010\SupportingInformation\EXPERIMENTAL-DATA\T180P50\T180P50_2.JDF			Frequency (MHz)	399.78
Nucleus	1H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	34.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	19.800	Spectrum Type	STANDARD

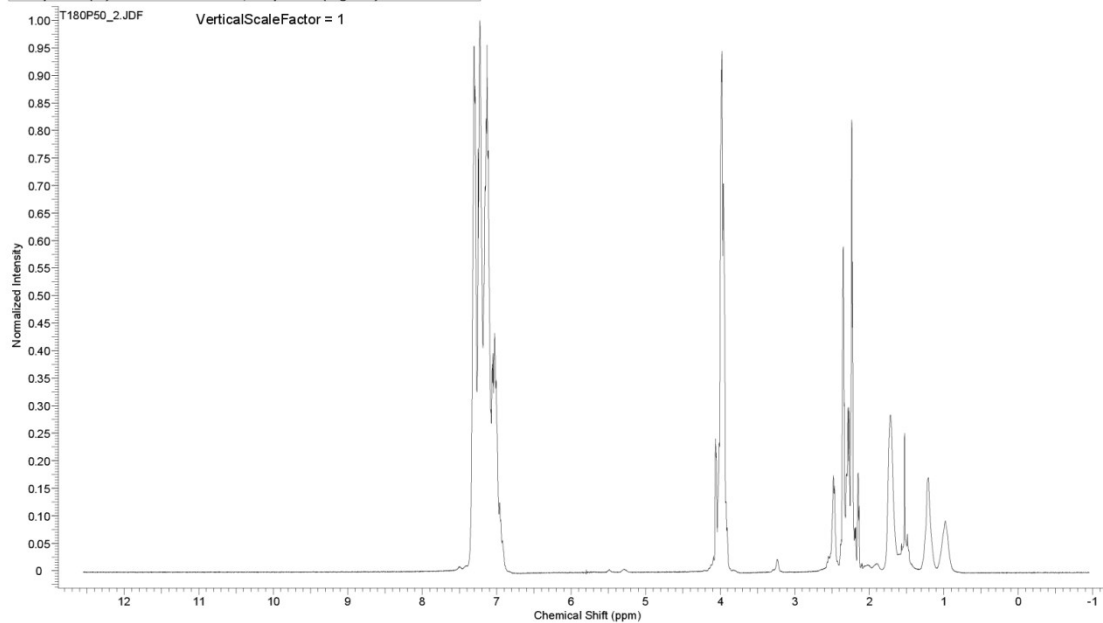


Figure S 55: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 2$ min (T=180°C; P=50 bar; Cat.: 0.5 wt% Ru/Al₂O₃; m[H₀-DBT] = 150g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

03.01.2016 21:14:18

Acquisition Time (sec)	2.4276	Date	21 Nov 2013 01:08:12	Date Stamp	21 Nov 2013 00:13:57
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Nucleus	1H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	20.100	Spectrum Type	STANDARD

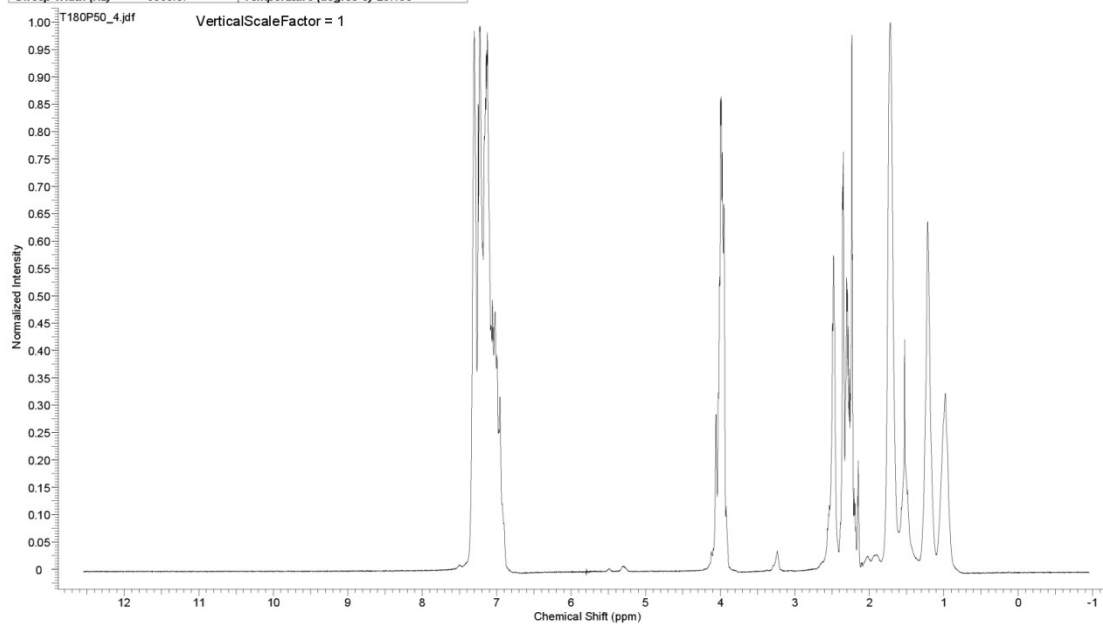


Figure S 56: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 4$ min (T=180°C; P=50 bar; Cat.: 0.5 wt% Ru/Al₂O₃; m[H₀-DBT] = 150g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

03.01.2016 21:14:26

Acquisition Time (sec)	2.4276	Date	21 Nov 2013 00:47:34	Date Stamp	20 Nov 2013 18:05:33
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T180P50\T180P50_6.jdf			Frequency (MHz)	399.78
Nucleus	1H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d			Receiver Gain	32.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	20.200	Spectrum Offset (Hz)	2318.7368
				Spectrum Type	STANDARD

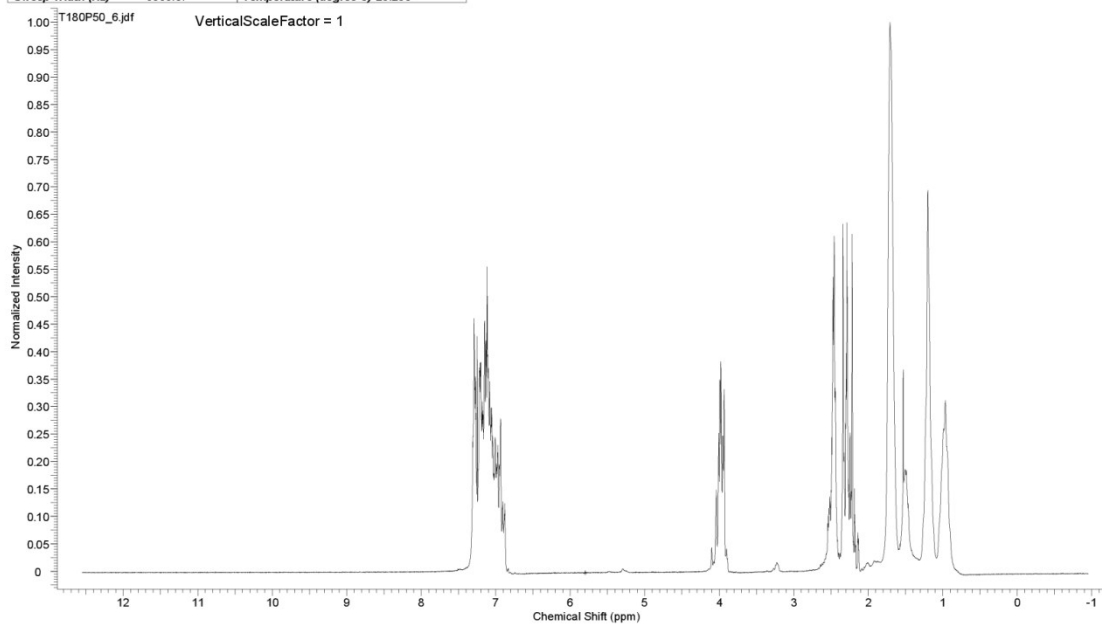


Figure S 57: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 6$ min ($T=180^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:14:37

Acquisition Time (sec)	2.4276	Date	21 Nov 2013 01:18:11	Date Stamp	21 Nov 2013 00:23:55
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T180P50\T180P50_8.jdf			Frequency (MHz)	399.78
Nucleus	1H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d			Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	20.000	Spectrum Offset (Hz)	2318.7368
				Spectrum Type	STANDARD

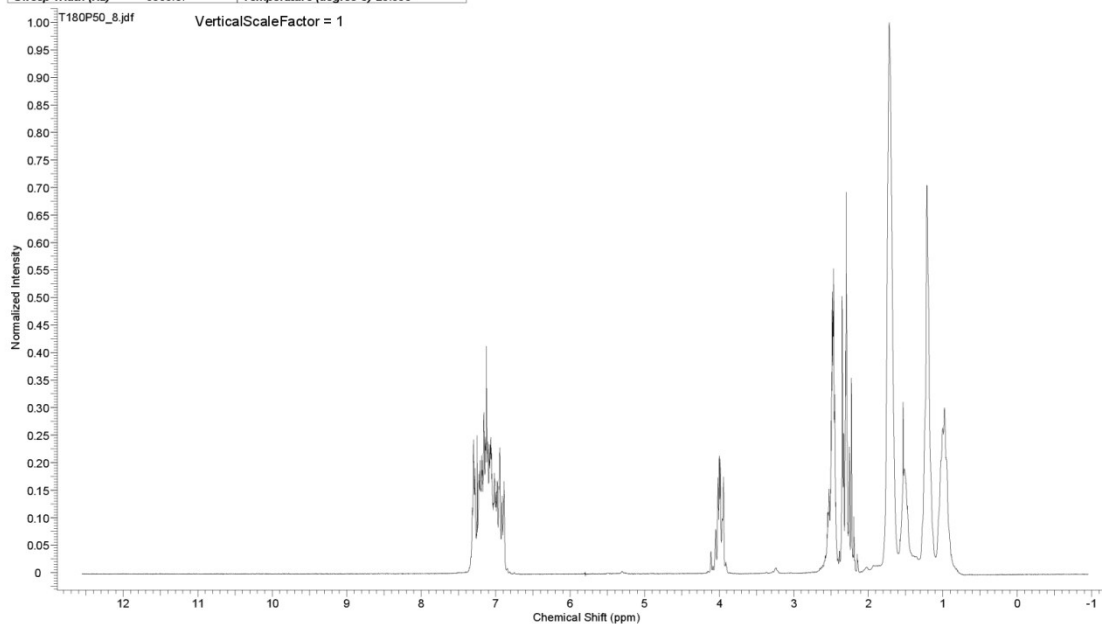


Figure S 58: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 8$ min ($T=180^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:14:45

Acquisition Time (sec)	2.4276	Date	21 Nov 2013 01:03:06	Date Stamp	21 Nov 2013 00:08:50
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T180P50\T180P50_10.jdf			Frequency (MHz)	399.78
Nucleus	1H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	20.100	Spectrum Type	STANDARD

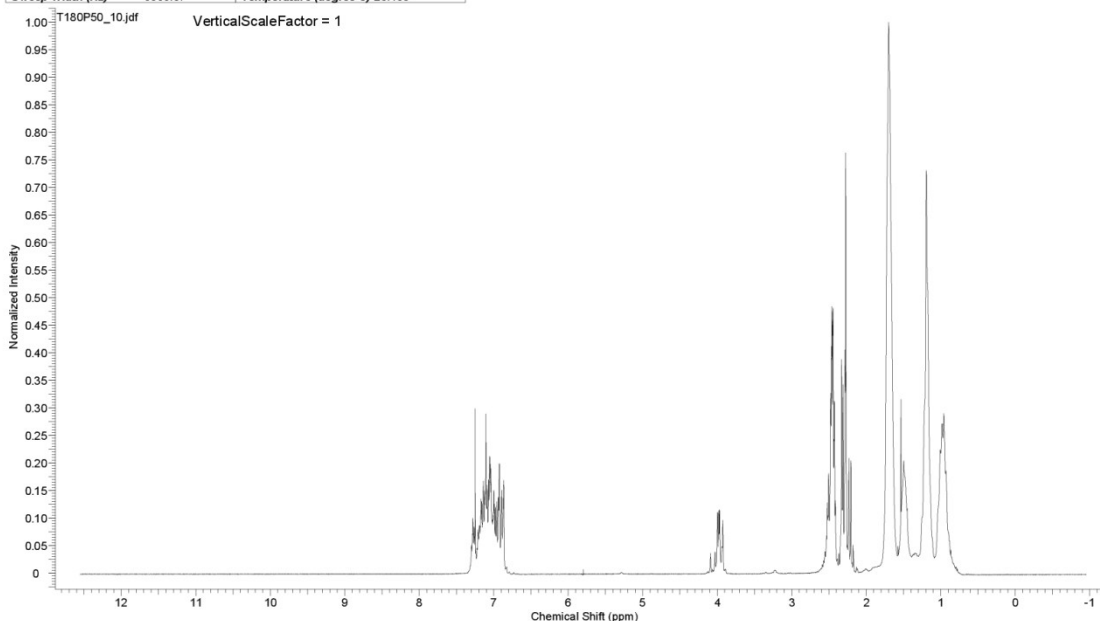


Figure S 59: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 10$ min ($T=180^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H}_0\text{-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:14:51

Acquisition Time (sec)	2.4276	Date	21 Nov 2013 00:42:07	Date Stamp	20 Nov 2013 18:00:06
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T180P50\T180P50_12.5.jdf			Frequency (MHz)	399.78
Nucleus	1H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	20.300	Spectrum Type	STANDARD

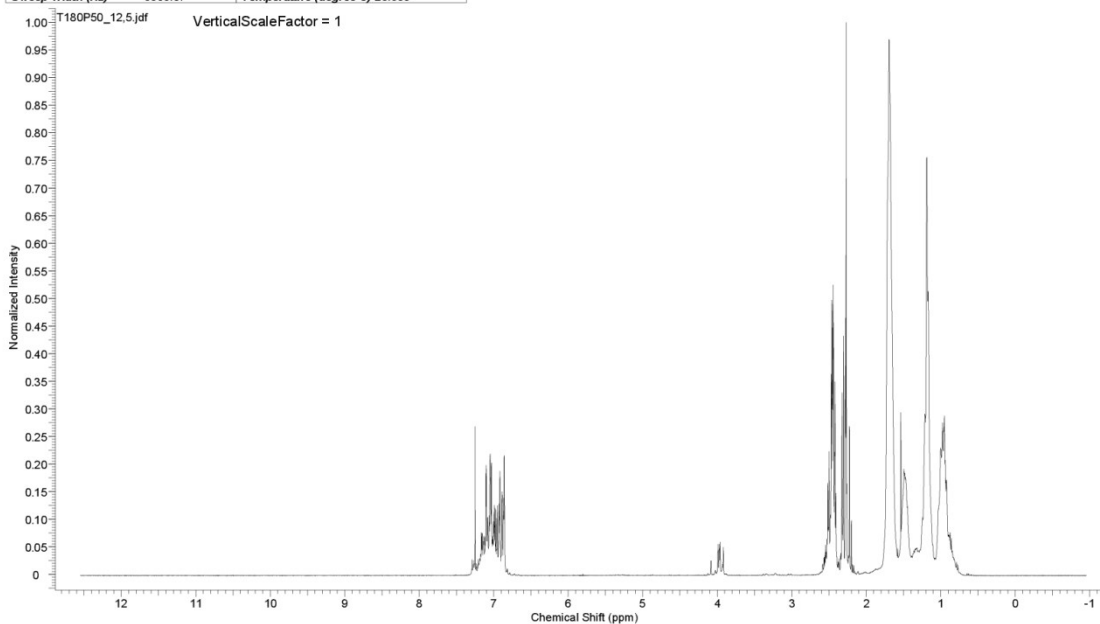


Figure S 60: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 12.5$ min ($T=180^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H}_0\text{-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:14:59

Acquisition Time (sec)	2.4276	Date	21 Nov 2013 01:23:41	Date Stamp	21 Nov 2013 00:29:25
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T180P50\T180P50_15.jdf			Frequency (MHz)	399.78
Nucleus	1H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	20.000	Spectrum Type	STANDARD

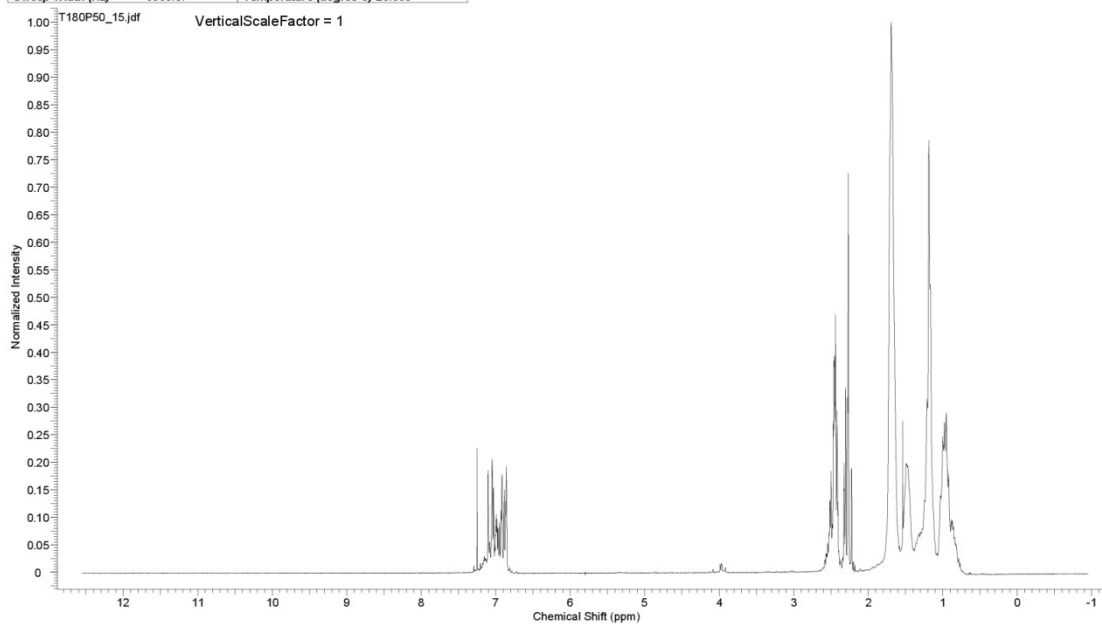


Figure S 61: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 15$ min ($T=180^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H}_0\text{-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

03.01.2016 21:15:06

Acquisition Time (sec)	2.4276	Date	21 Nov 2013 00:57:53	Date Stamp	21 Nov 2013 00:03:37
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T180P50\T180P50_20.jdf			Frequency (MHz)	399.78
Nucleus	1H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	20.200	Spectrum Type	STANDARD

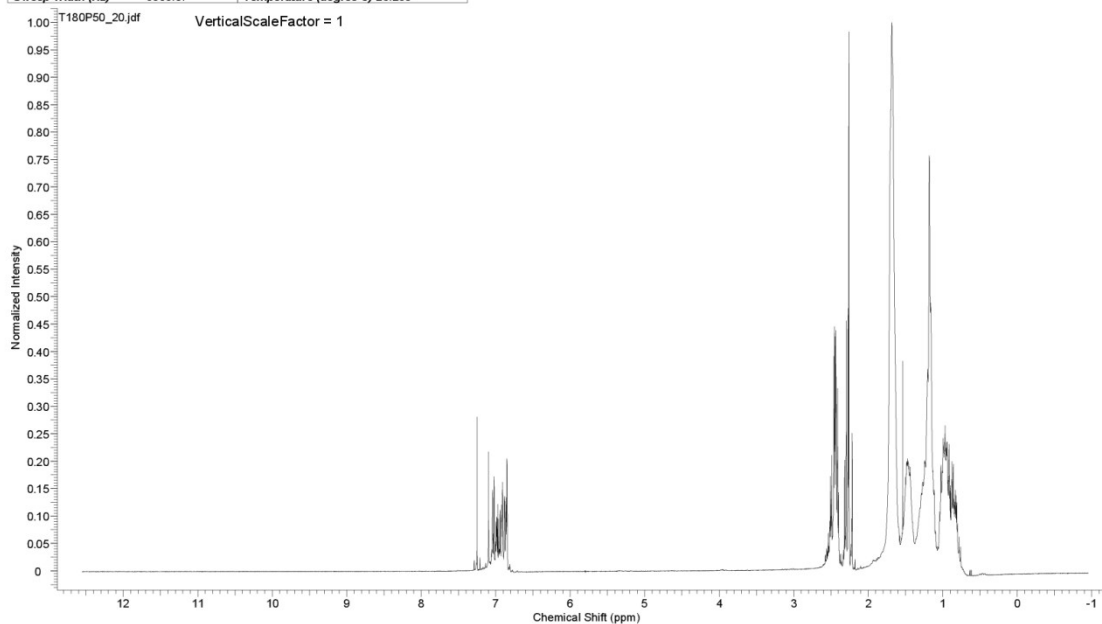


Figure S 62: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 20$ min ($T=180^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H}_0\text{-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

03.01.2016 21:15:18

Acquisition Time (sec)	2.4276	Date	21 Nov 2013 01:39:41	Date Stamp	21 Nov 2013 00:45:25
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T180P50\T180P50_25.jdf			Frequency (MHz)	399.78
Nucleus	1H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	32.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	19.800	Spectrum Type	STANDARD

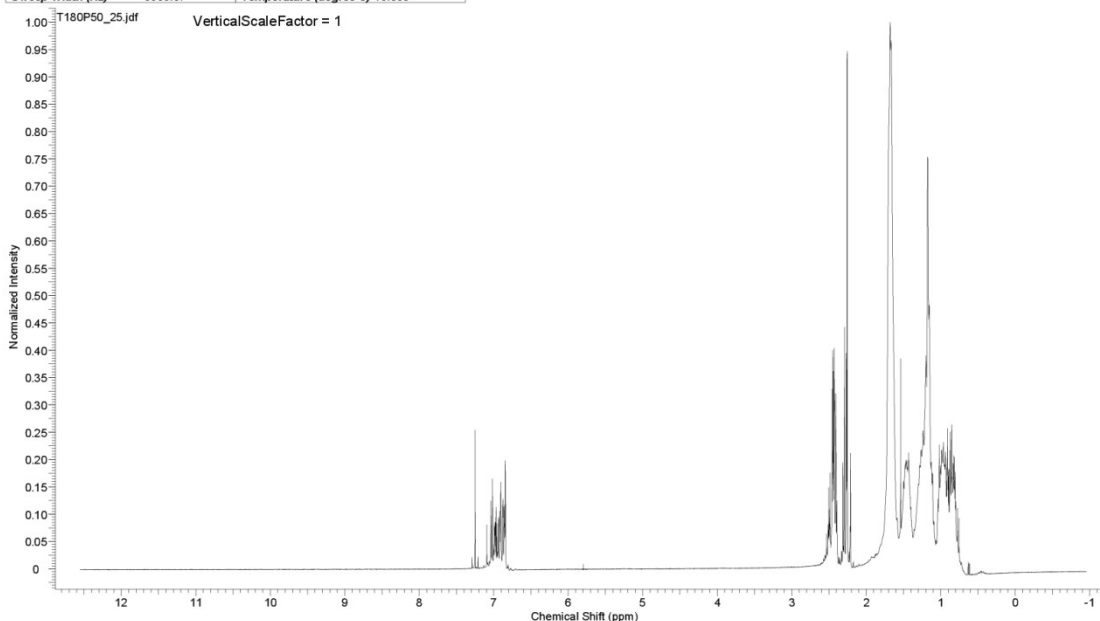


Figure S 63: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 25$ min ($T=180^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% $\text{Ru}/\text{Al}_2\text{O}_3$; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

03.01.2016 21:15:25

Acquisition Time (sec)	2.4276	Date	21 Nov 2013 01:13:02	Date Stamp	21 Nov 2013 00:18:46
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T180P50\T180P50_30.jdf			Frequency (MHz)	399.78
Nucleus	1H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	20.100	Spectrum Type	STANDARD

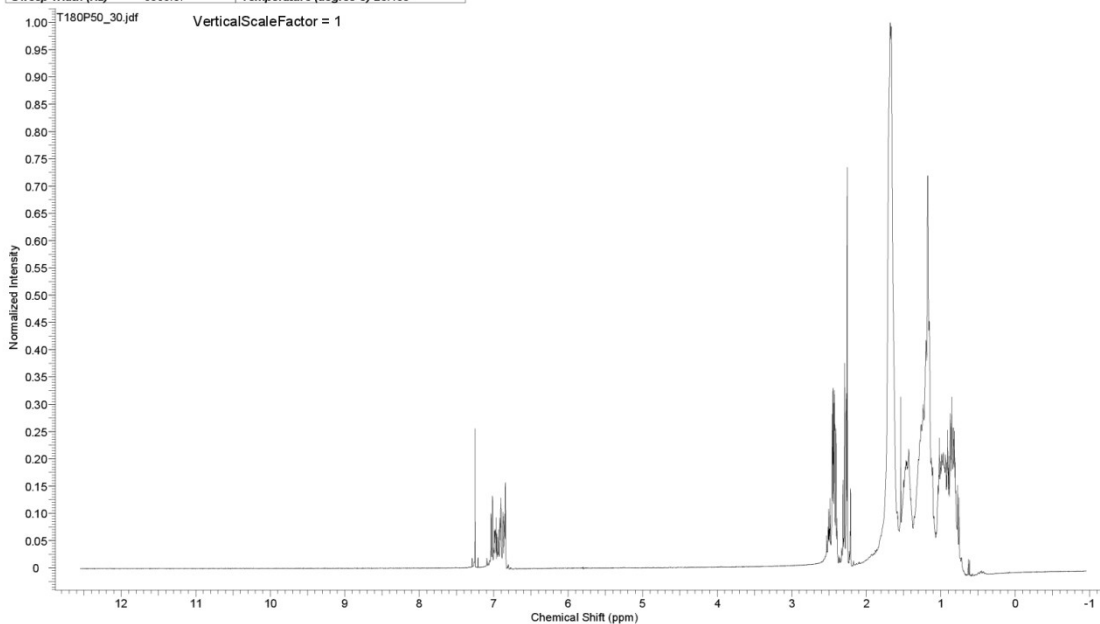


Figure S 64: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 30$ min ($T=180^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% $\text{Ru}/\text{Al}_2\text{O}_3$; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:15:32

Acquisition Time (sec)	2.4276	Date	21 Nov 2013 01:28:57	Date Stamp	21 Nov 2013 00:34:41
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T180P50\T180P50_35.jdf			Frequency (MHz)	399.78
Nucleus	1H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	20.100	Spectrum Type	STANDARD

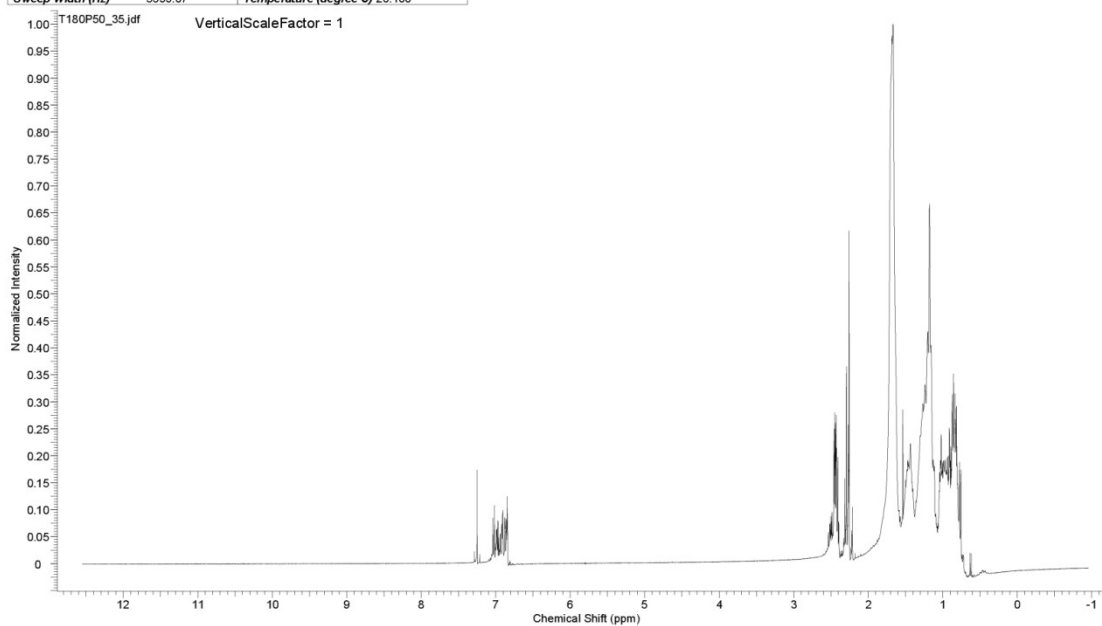


Figure S 65: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 35$ min ($T=180^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:15:40

Acquisition Time (sec)	2.4276	Date	21 Nov 2013 00:36:48	Date Stamp	20 Nov 2013 17:54:48
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T180P50\T180P50_40.jdf			Frequency (MHz)	399.78
Nucleus	1H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	20.400	Spectrum Type	STANDARD

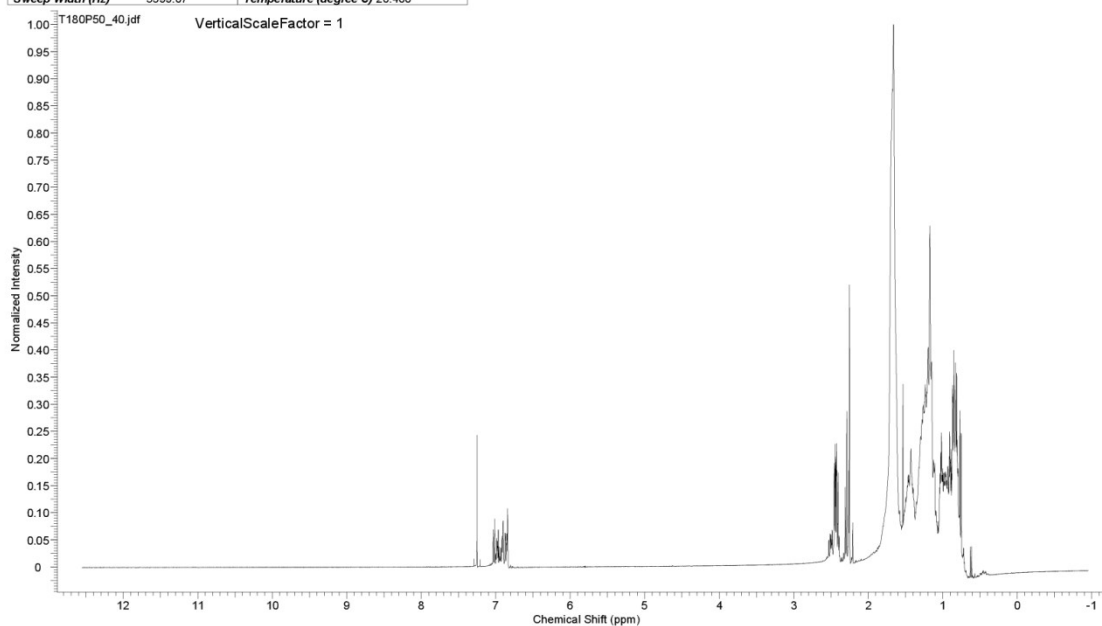


Figure S 66: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 40$ min ($T=180^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:15:48

Acquisition Time (sec)	2.4276	Date	21 Nov 2013 08:17:31	Date Stamp	21 Nov 2013 07:23:15
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T180P50\T180P50_50.jdf			Frequency (MHz)	399.78
Nucleus	1H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d			Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	19.600	Spectrum Offset (Hz)	2318.7368
				Spectrum Type	STANDARD

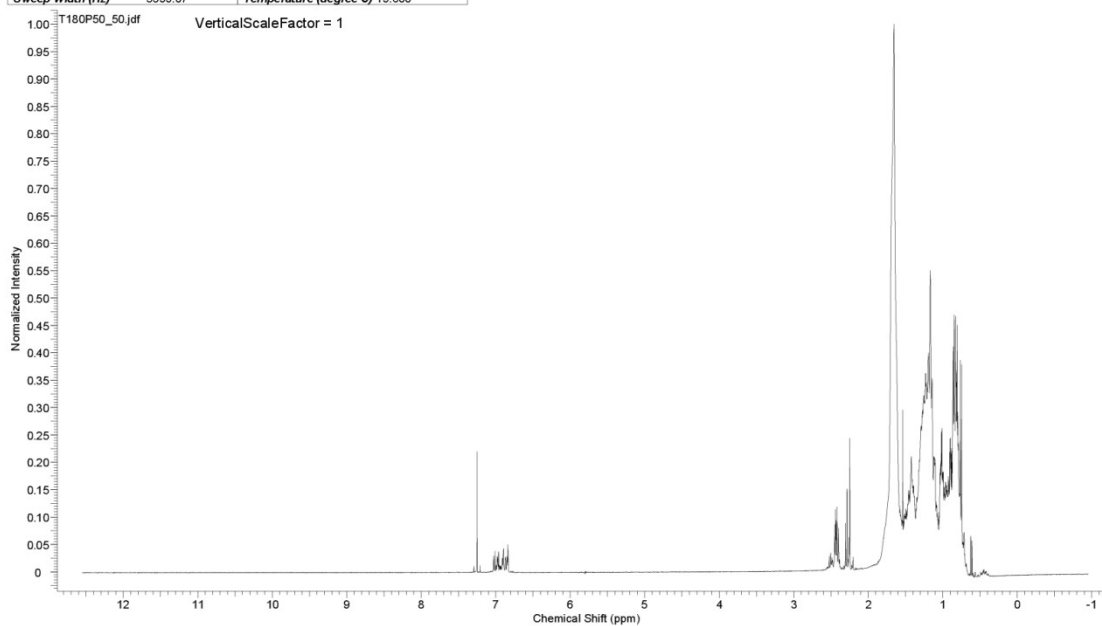


Figure S 67: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 50$ min ($T=180^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H}_0\text{-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

03.01.2016 21:15:54

Acquisition Time (sec)	2.4276	Date	21 Nov 2013 08:12:28	Date Stamp	21 Nov 2013 07:18:12
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T180P50\T180P50_60.jdf			Frequency (MHz)	399.78
Nucleus	1H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d			Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	19.500	Spectrum Offset (Hz)	2318.7368
				Spectrum Type	STANDARD

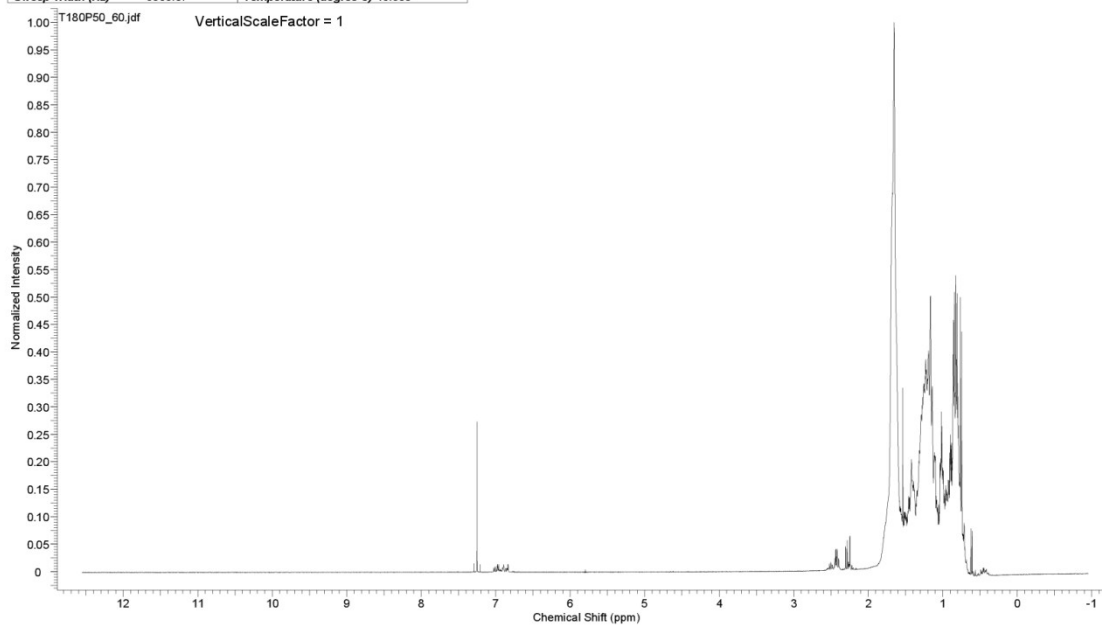


Figure S 68: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 60$ min ($T=180^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H}_0\text{-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:16:00

Acquisition Time (sec)	2.4276	Date	21 Nov 2013 08:23:01	Date Stamp	21 Nov 2013 07:28:45
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T180P50\T180P50_90.jdf			Frequency (MHz)	399.78
Nucleus	1H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Temperature (degree C)	19.400	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Spectrum Offset (Hz)	2318.7368	Spectrum Type	STANDARD

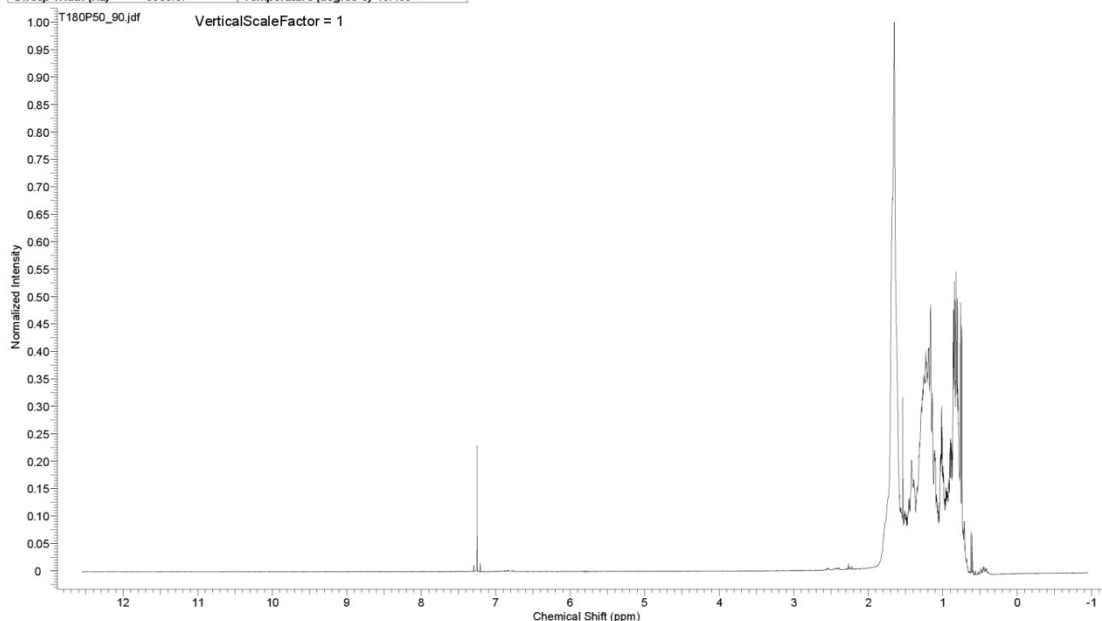


Figure S 69: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 90$ min ($T=180^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H}_0\text{-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:16:10

Acquisition Time (sec)	2.4276	Date	21 Nov 2013 08:07:22	Date Stamp	21 Nov 2013 07:13:05
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T180P50\T180P50_120.jdf			Frequency (MHz)	399.78
Nucleus	1H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Temperature (degree C)	19.500	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Spectrum Offset (Hz)	2318.7368	Spectrum Type	STANDARD

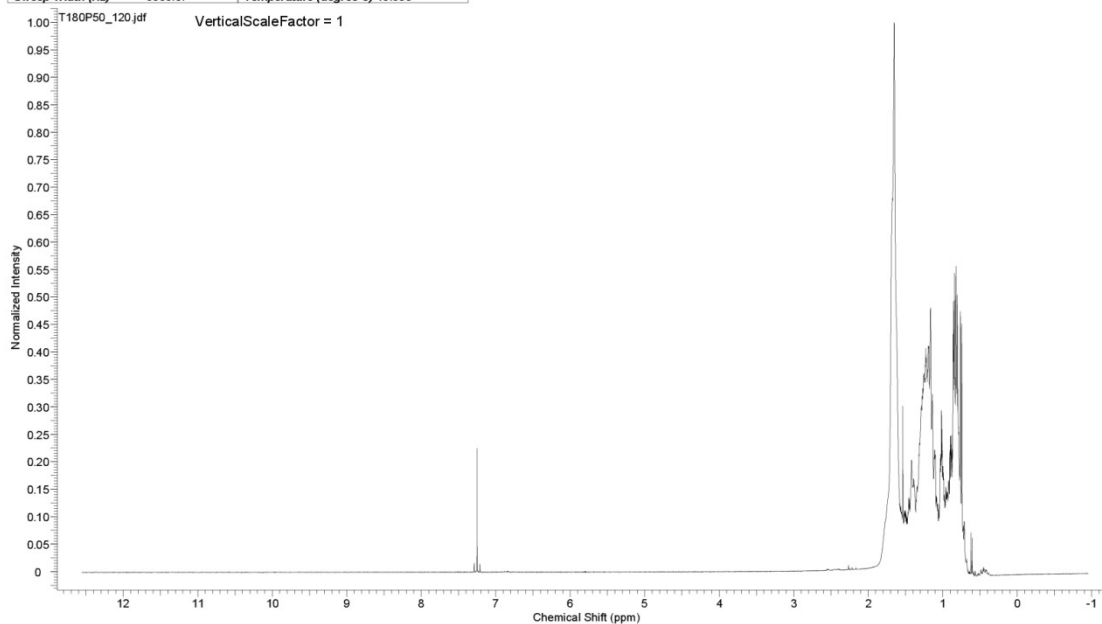


Figure S 70: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 120$ min ($T=180^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H}_0\text{-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

T = 200 °C ; P = 50 bar

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03.01.2016 21:20:38

Acquisition Time (sec)	2.4276	Date	26 Nov 2013 12:26:53	Date Stamp	26 Nov 2013 11:30:01
File Name	D:\PAPER_3010\SupportingInformation\EXPERIMENTAL-DATA\T200P50\T200P50_2.JDF			Frequency (MHz)	399.78
Nucleus	1H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	16.200	Spectrum Type	STANDARD

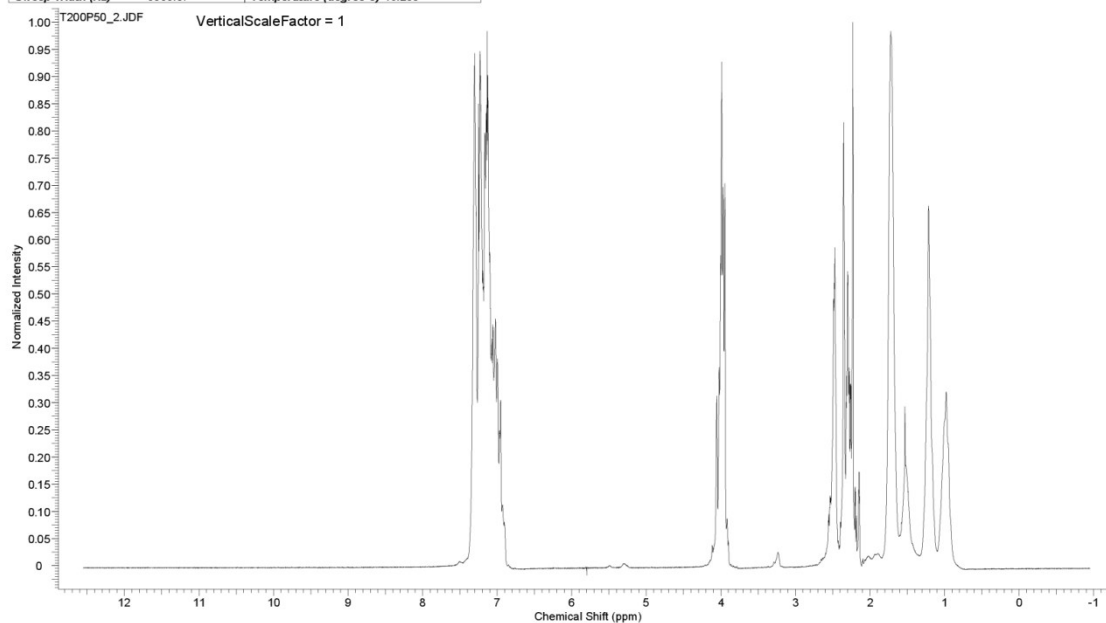


Figure S 71: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 2$ min (T=200°C; P=50 bar; Cat.: 0.5 wt% Ru/Al₂O₃; m[H₀-DBT] = 150g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:20:30

Acquisition Time (sec)	2.4276	Date	26 Nov 2013 13:41:29	Date Stamp	26 Nov 2013 12:44:37
File Name	D:\Paper_3010\SupportingInformation\Experimental-Datal\T200P50\T200P50_4.jdf			Frequency (MHz)	399.78
Nucleus	1H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	16.000	Spectrum Type	STANDARD

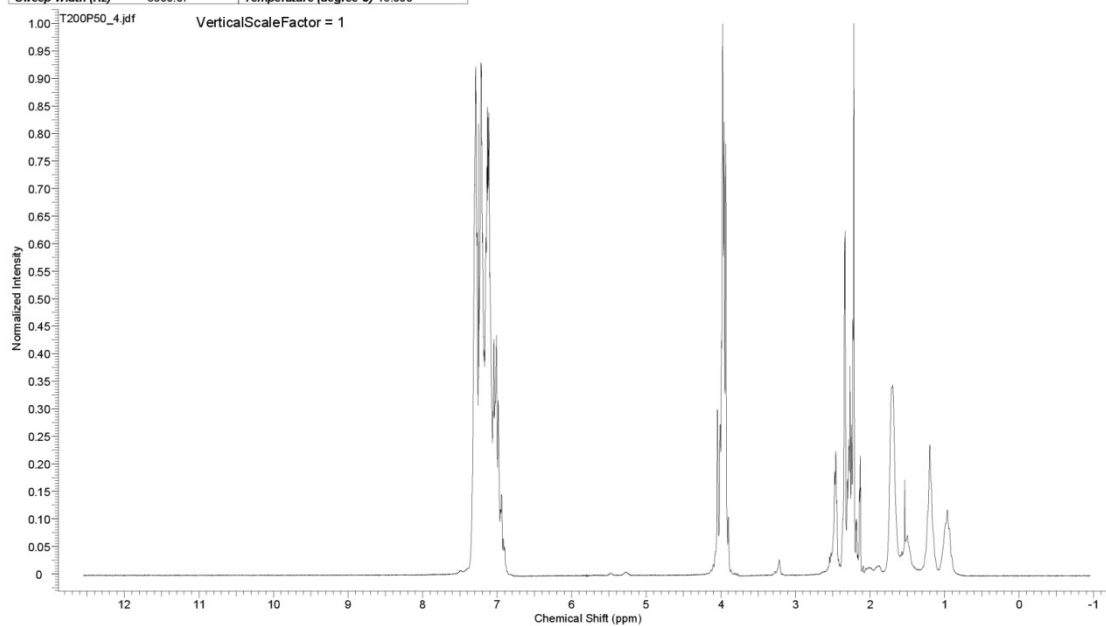


Figure S 72: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 4$ min (T=200°C; P=50 bar; Cat.: 0.5 wt% Ru/Al₂O₃; m[H₀-DBT] = 150g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:20:19

Acquisition Time (sec)	2.4276	Date	26 Nov 2013 13:57:42	Date Stamp	26 Nov 2013 13:00:50
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T200P50\T200P50_6.jdf	Frequency (MHz)	399.78	Original Points Count	13107
Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	16.000	Spectrum Type	STANDARD

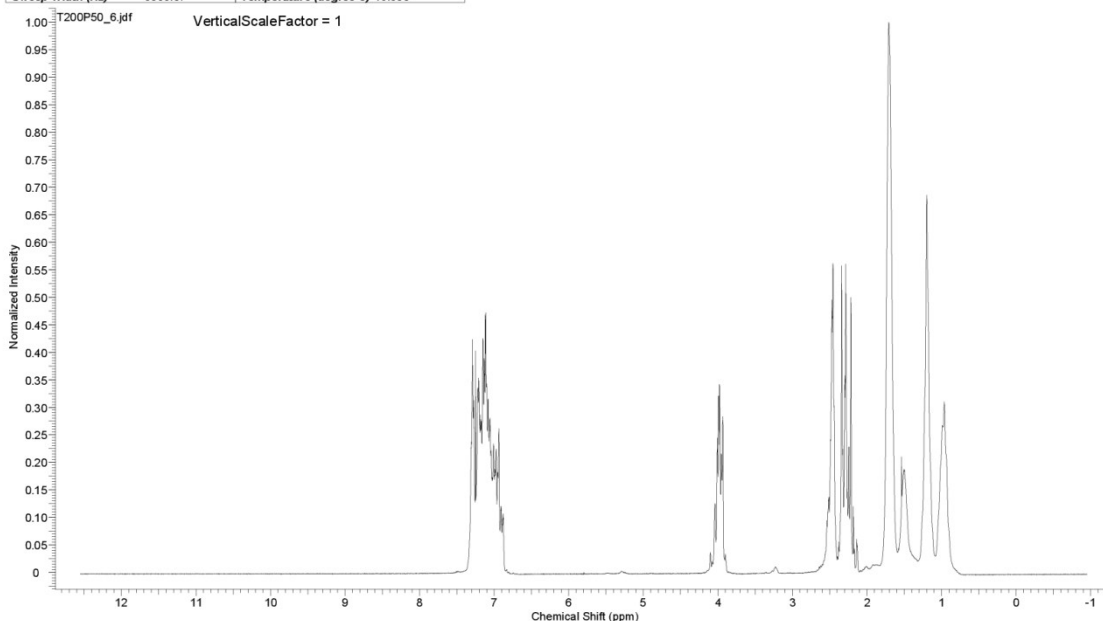


Figure S 73: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 6$ min ($T=200^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:20:10

Acquisition Time (sec)	2.4276	Date	26 Nov 2013 14:03:07	Date Stamp	26 Nov 2013 13:06:15
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T200P50\T200P50_8.jdf	Frequency (MHz)	399.78	Original Points Count	13107
Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	15.900	Spectrum Type	STANDARD

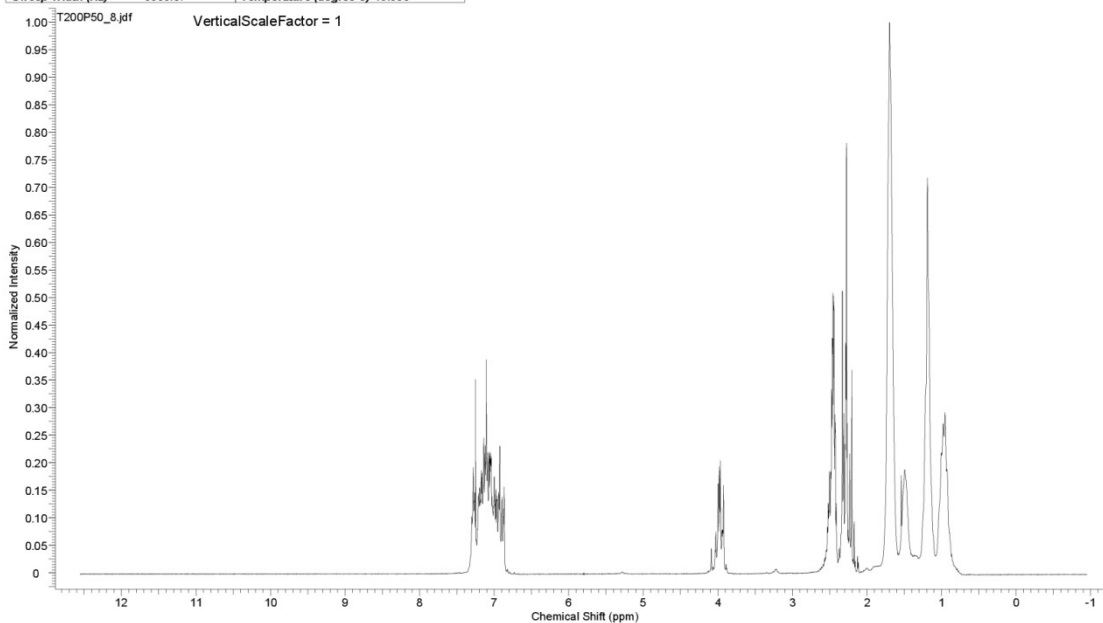


Figure S 74: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 8$ min ($T=200^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:20:02

Acquisition Time (sec)	2.4276	Date	26 Nov 2013 12:16:15	Date Stamp	26 Nov 2013 11:19:23
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T200P50\T200P50_10.jdf	Frequency (MHz)	399.78	Original Points Count	13107
Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	16.200	Spectrum Type	STANDARD

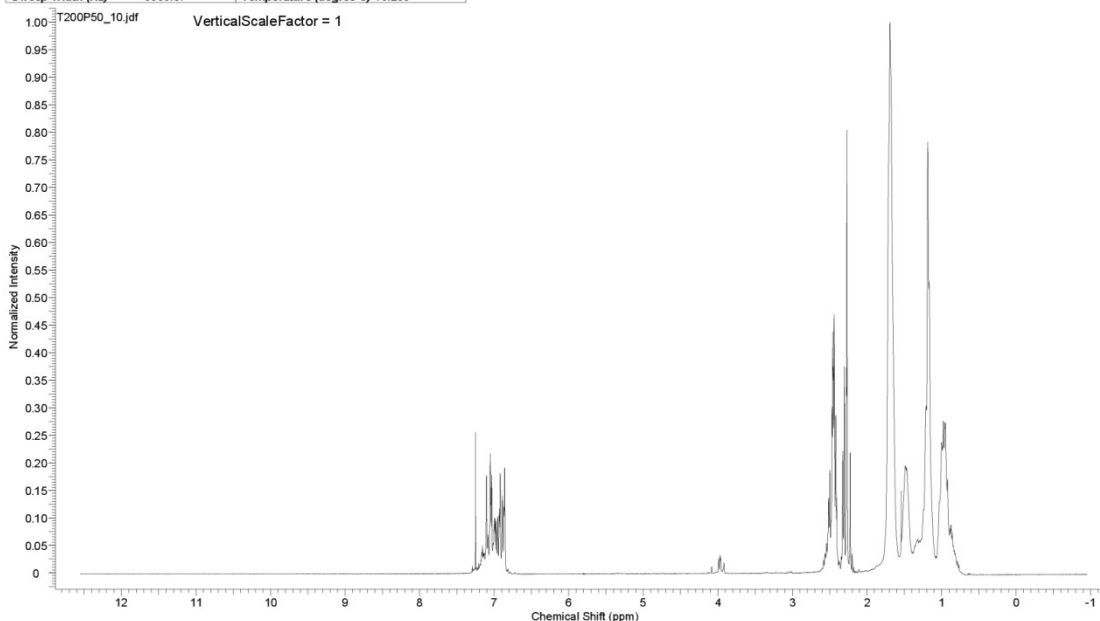


Figure S 75: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 10$ min ($T=200^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:19:52

Acquisition Time (sec)	2.4276	Date	26 Nov 2013 12:21:40	Date Stamp	26 Nov 2013 11:24:48
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T200P50\T200P50_12.5.jdf	Frequency (MHz)	399.78	Original Points Count	13107
Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	28.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	16.300	Spectrum Type	STANDARD

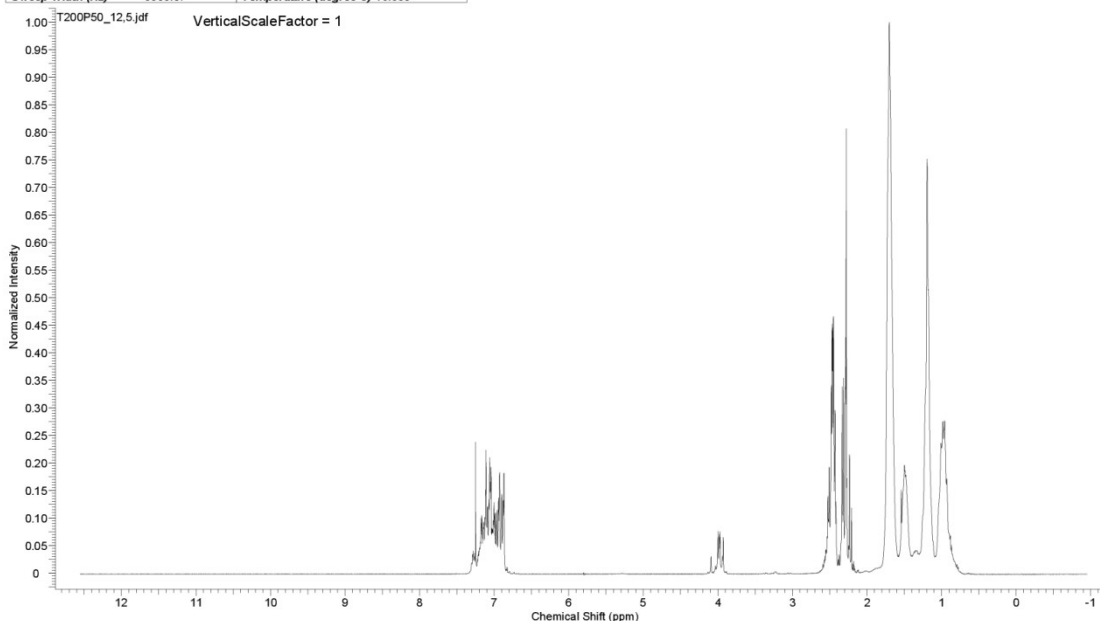


Figure S 76: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 12.5$ min ($T=200^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:19:40

Acquisition Time (sec)	2.4276	Date	27 Nov 2013 01:48:06	Date Stamp	27 Nov 2013 00:51:13
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T200P50\T200P50_15.jdf	Frequency (MHz)	399.78	Original Points Count	13107
Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	16.300	Spectrum Type	STANDARD

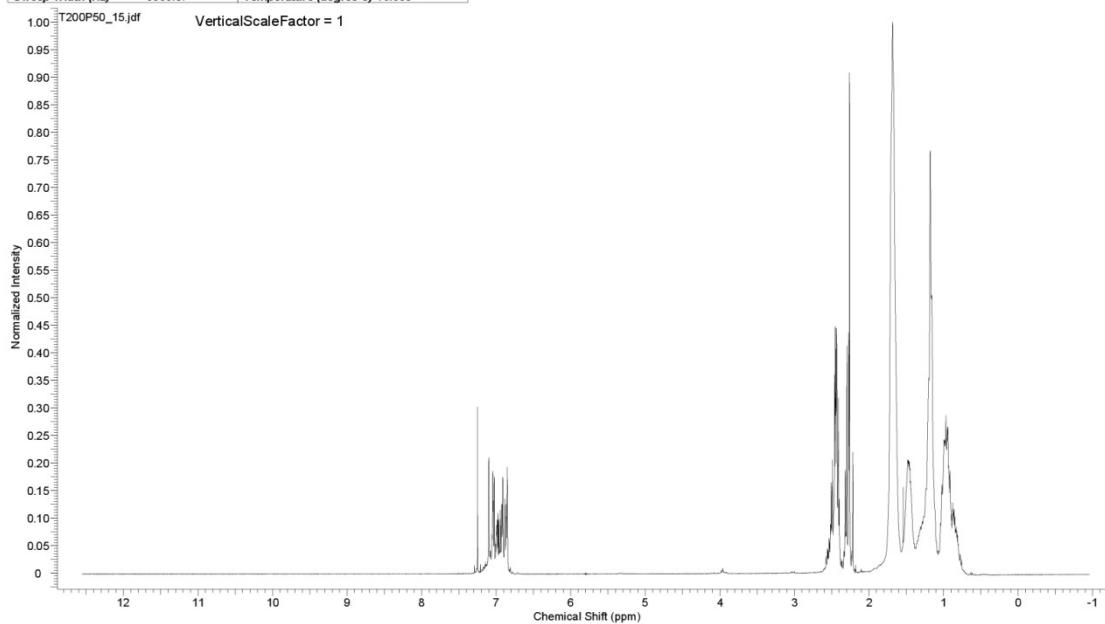


Figure S 77: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 15$ min ($T=200^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H}_0\text{-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:19:32

Acquisition Time (sec)	2.4276	Date	26 Nov 2013 12:32:19	Date Stamp	26 Nov 2013 11:35:27
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T200P50\T200P50_20.jdf	Frequency (MHz)	399.78	Original Points Count	13107
Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	16.200	Spectrum Type	STANDARD

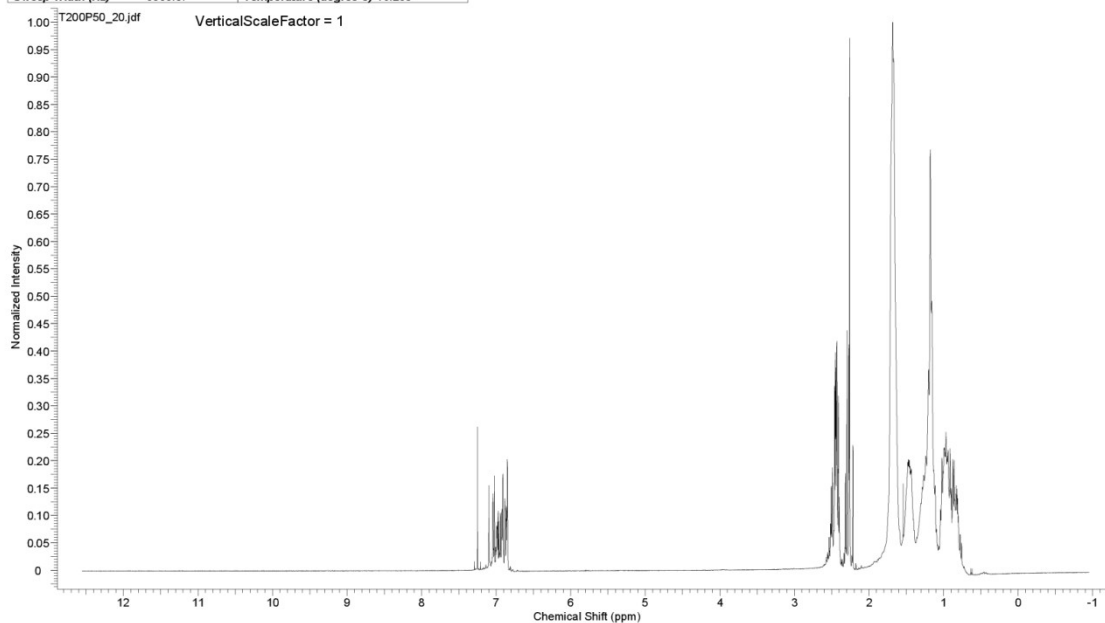


Figure S 78: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 20$ min ($T=200^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H}_0\text{-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:19:21

Acquisition Time (sec)	2.4276	Date	26 Nov 2013 12:43:03	Date Stamp	26 Nov 2013 11:46:11
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T200P50\T200P50_25.jdf	Frequency (MHz)	399.78	Original Points Count	13107
Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	28.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	16.200	Spectrum Type	STANDARD

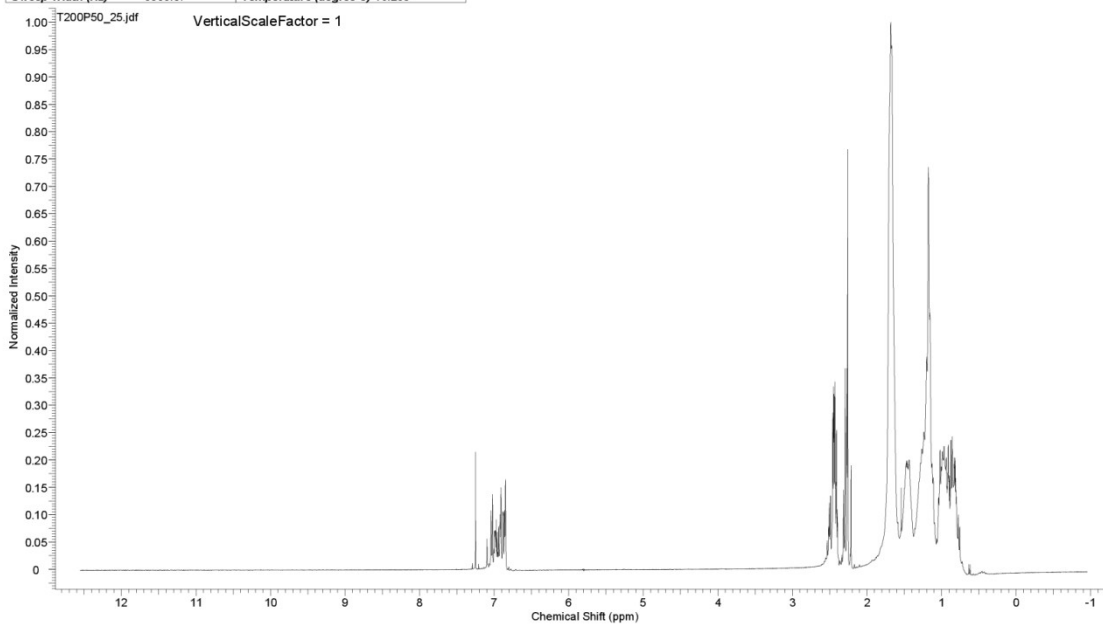


Figure S 79: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 25$ min ($T=200^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H}_0\text{-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:19:13

Acquisition Time (sec)	2.4276	Date	26 Nov 2013 13:52:07	Date Stamp	26 Nov 2013 12:55:15
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T200P50\T200P50_30.jdf	Frequency (MHz)	399.78	Original Points Count	13107
Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	28.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	16.100	Spectrum Type	STANDARD

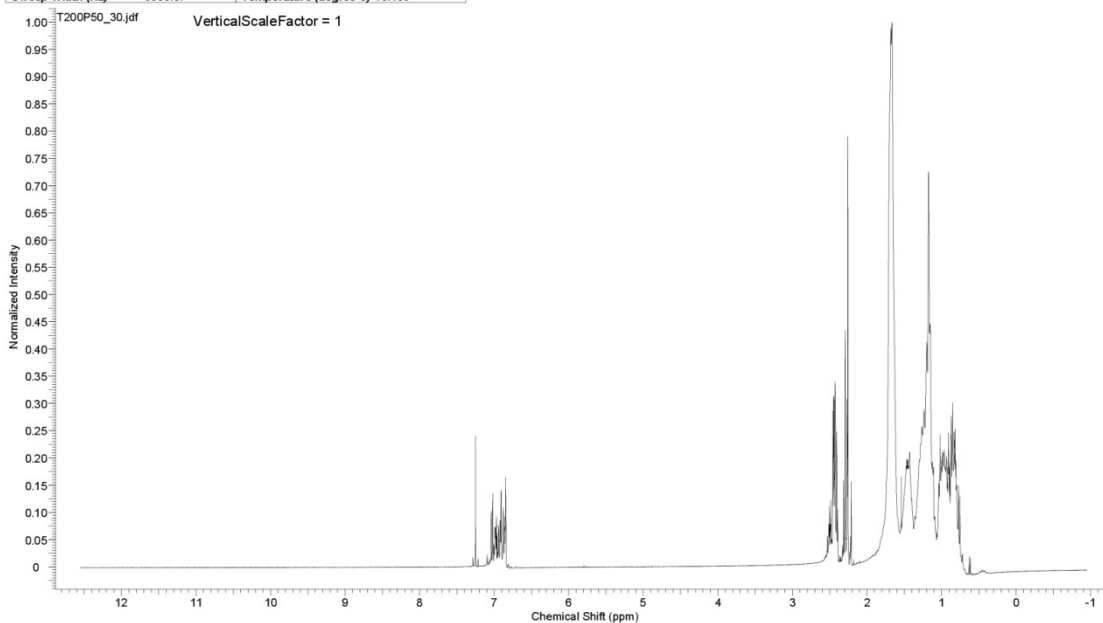


Figure S 80: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 30$ min ($T=200^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H}_0\text{-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:19:05

Acquisition Time (sec)	2.4276	Date	26 Nov 2013 12:53:44	Date Stamp	26 Nov 2013 11:56:52
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T200P50\T200P50_35.jdf	Frequency (MHz)	399.78	Original Points Count	13107
Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	16.000	Spectrum Type	STANDARD

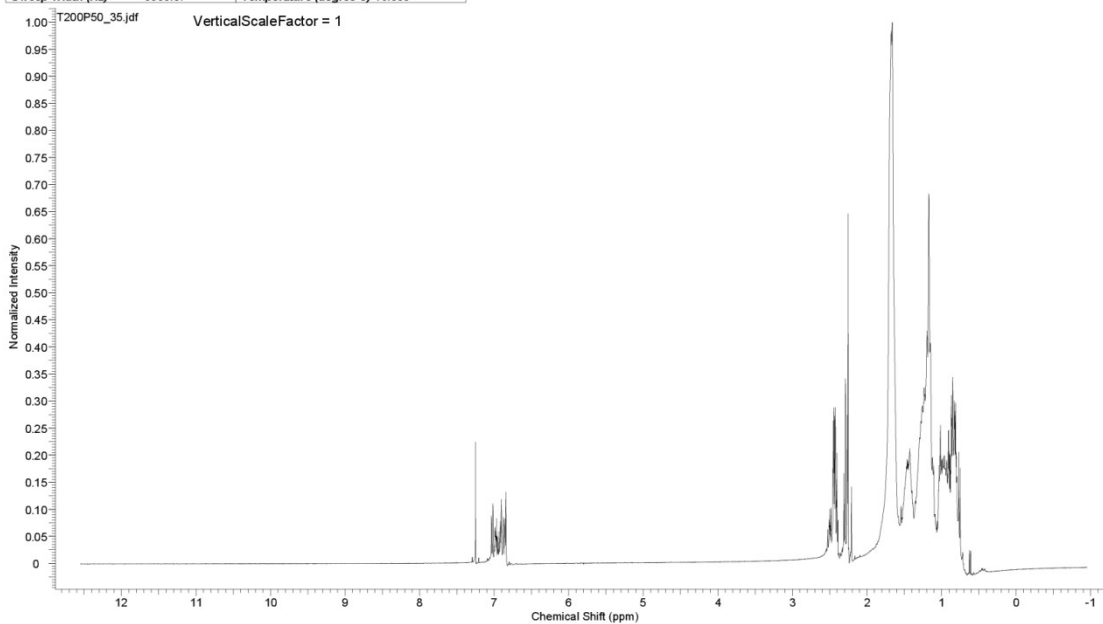


Figure S 81: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 35$ min ($T=200^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:18:57

Acquisition Time (sec)	2.4276	Date	26 Nov 2013 13:36:25	Date Stamp	26 Nov 2013 12:39:33
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T200P50\T200P50_40.jdf	Frequency (MHz)	399.78	Original Points Count	13107
Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	26.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	16.100	Spectrum Type	STANDARD

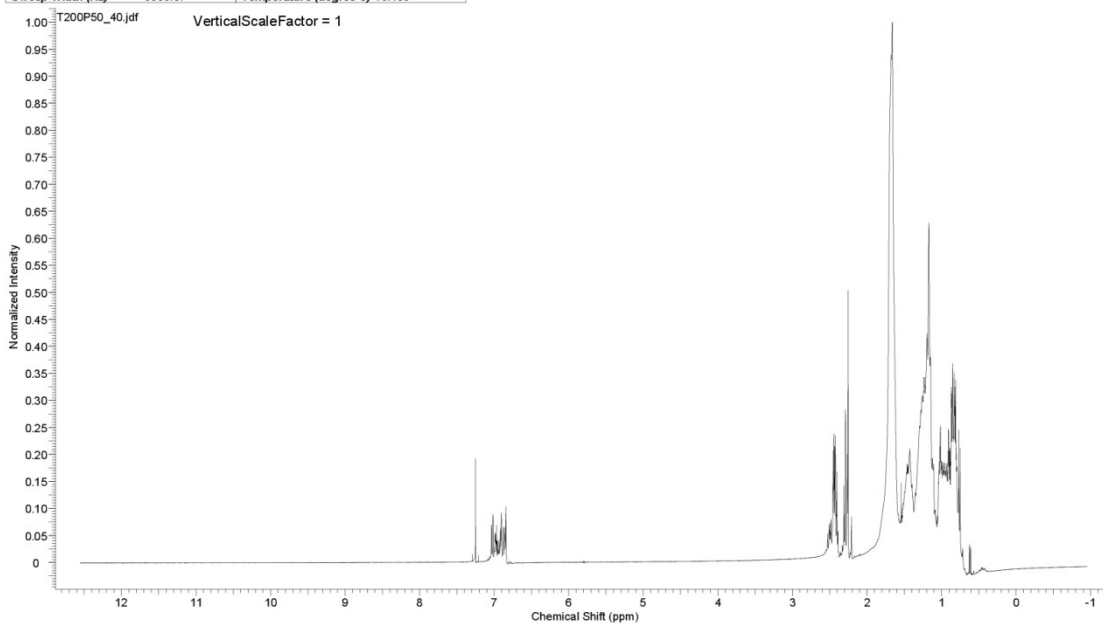


Figure S 82: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 40$ min ($T=200^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:18:44

Acquisition Time (sec)	2.4276	Date	26 Nov 2013 12:37:34	Date Stamp	26 Nov 2013 11:40:42
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T200P50\T200P50_50.jdf	Frequency (MHz)	399.78	Original Points Count	13107
Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	30.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	16.300	Spectrum Type	STANDARD

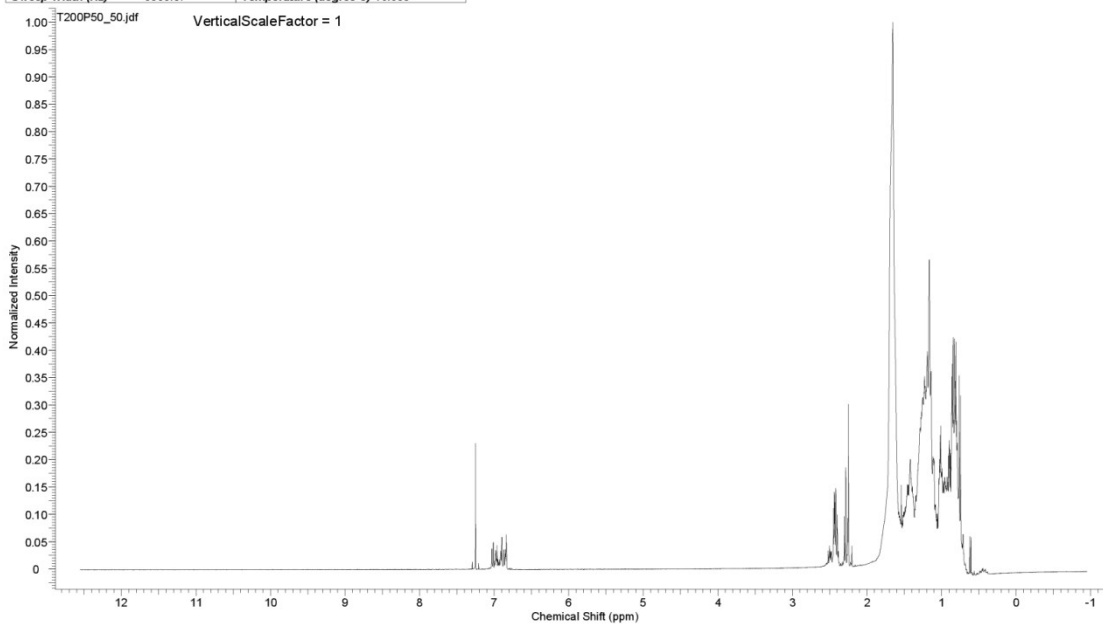


Figure S 83: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 50$ min ($T=200^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:18:34

Acquisition Time (sec)	2.4276	Date	26 Nov 2013 12:48:42	Date Stamp	26 Nov 2013 11:51:51
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T200P50\T200P50_60.jdf	Frequency (MHz)	399.78	Original Points Count	13107
Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	2318.7368	Receiver Gain	28.00
Sweep Width (Hz)	5399.07	Temperature (degree C)	16.100	Spectrum Type	STANDARD

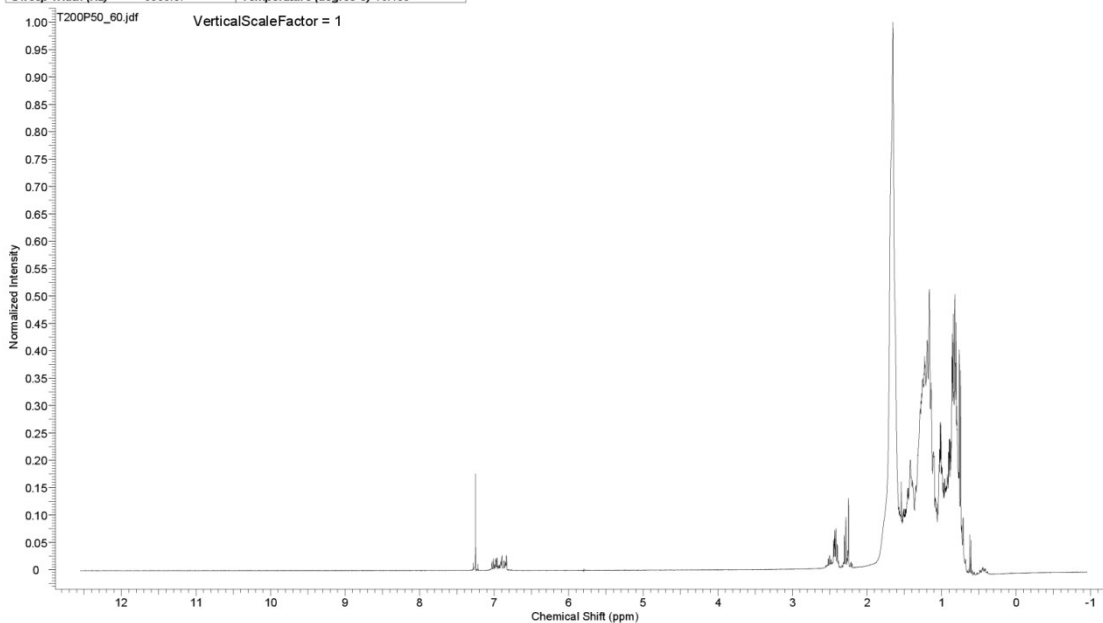


Figure S 84: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 60$ min ($T=200^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:18:24

Acquisition Time (sec)	2.4276	Date	26 Nov 2013 13:46:42	Date Stamp	26 Nov 2013 12:49:50
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T200P50\T200P50_90.jdf	Frequency (MHz)	399.78	Original Points Count	13107
Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse ex2
Solvent	CHLOROFORM-d	Temperature (degree C)	16.100	Spectrum Offset (Hz)	2318.7368
Sweep Width (Hz)	5399.07			Receiver Gain	26.00
				Spectrum Type	STANDARD

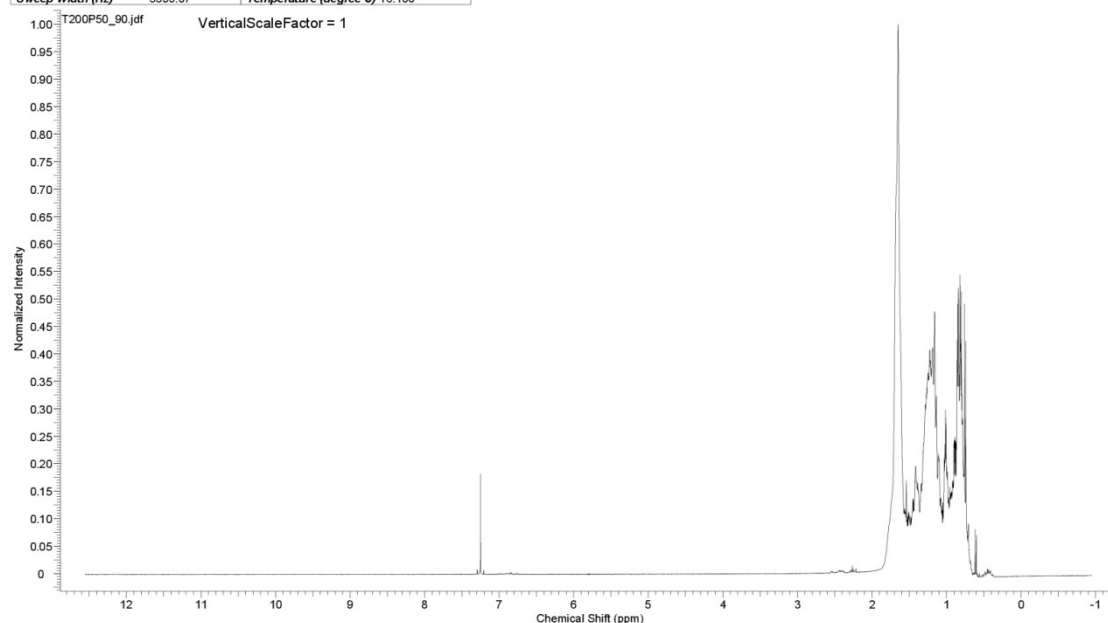


Figure S 85: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 90$ min ($T=200^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)

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03.01.2016 21:18:13

Acquisition Time (sec)	2.4276	Date	05 Dec 2013 03:01:24	Date Stamp	05 Dec 2013 02:04:23
File Name	D:\Paper_3010\SupportingInformation\Experimental-Data\T200P50\T200P50_120.jdf	Frequency (MHz)	399.78	Original Points Count	13107
Nucleus	¹ H	Number of Transients	8	Origin	ECX400
Owner	Administrator	Points Count	13107	Pulse Sequence	single_pulse ex2
Solvent	CHLOROFORM-d	Temperature (degree C)	18.700	Spectrum Offset (Hz)	2318.7368
Sweep Width (Hz)	5399.07			Receiver Gain	26.00
				Spectrum Type	STANDARD

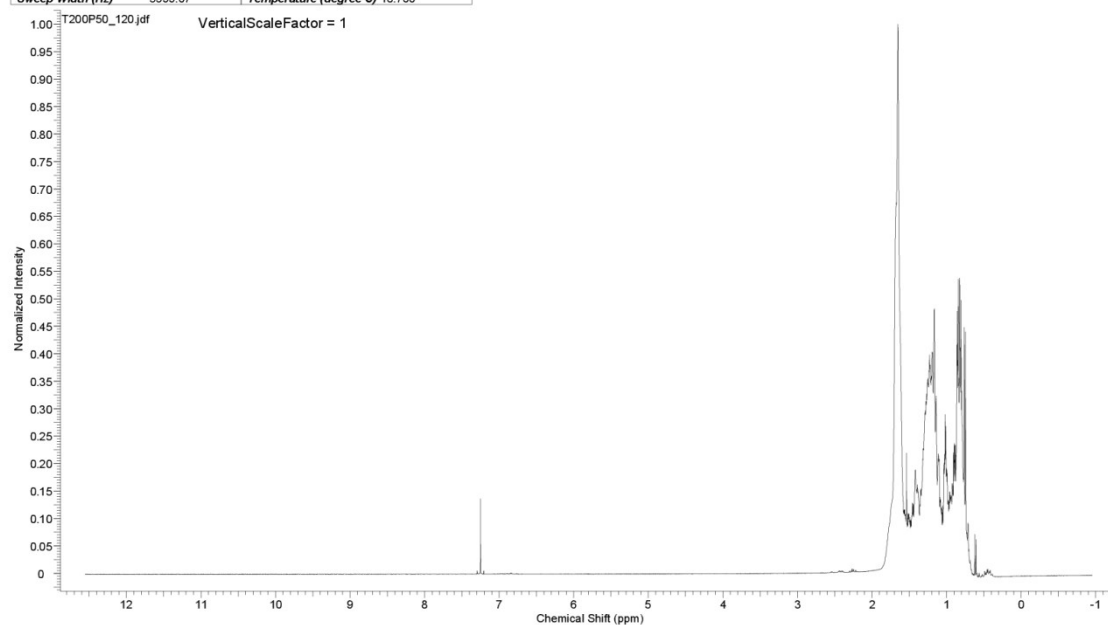


Figure S 86: Hydrogenation of Dibenzyltoluene $t_{\text{sample}} = 120$ min ($T=200^{\circ}\text{C}$; $P=50$ bar; Cat.: 0.5 wt% Ru/ Al_2O_3 ; $m[\text{H0-DBT}] = 150$ g; $n_{\text{Ru}}/n_{\text{Al}_2\text{O}_3} = 0.25$ mol%)