Electronic Supplementary Material (ESI) for Reaction Chemistry & Engineering.

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

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

Supporting Information

Predicted Data

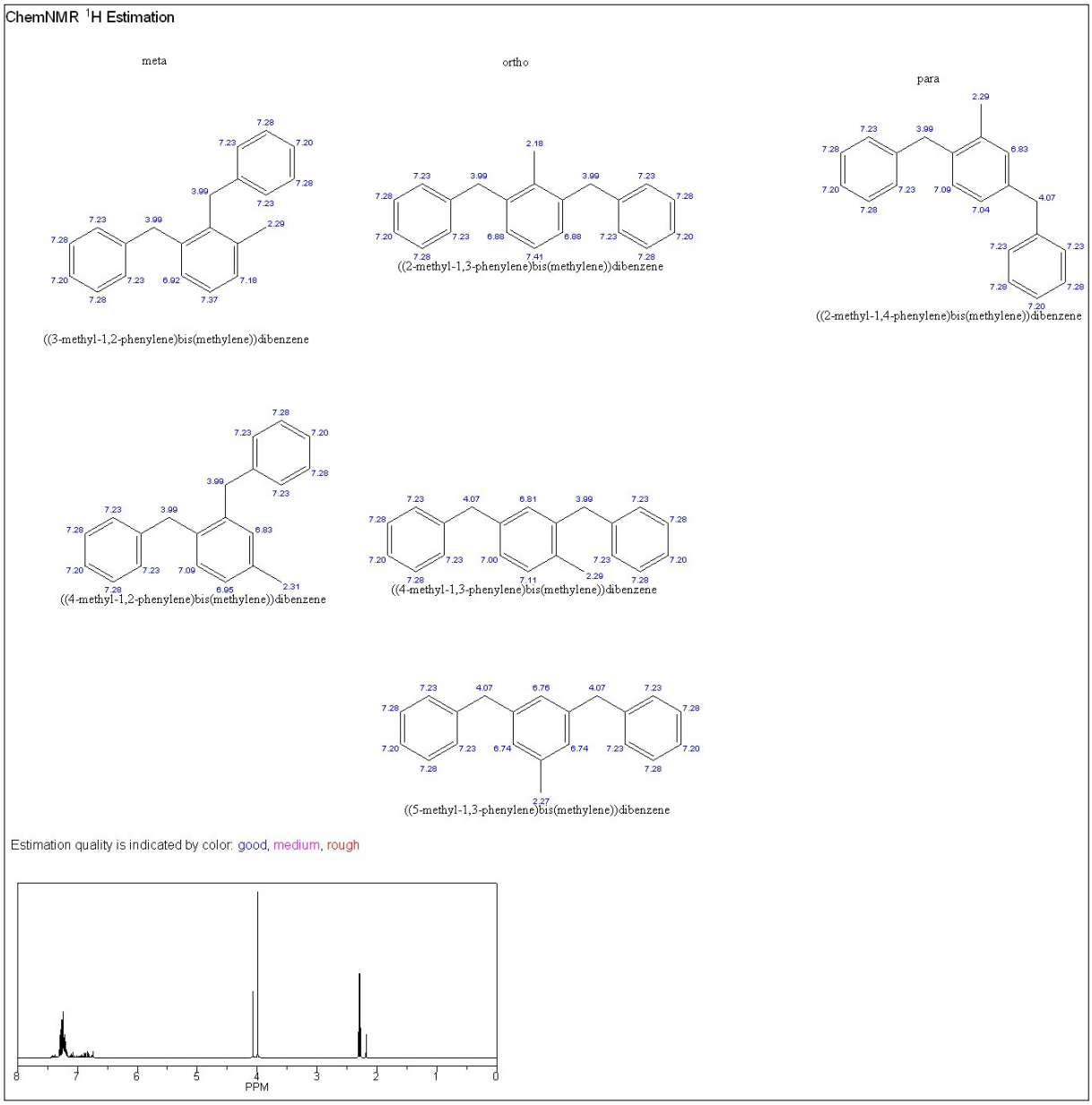

Figure S 1: All H0-DBT$_{OOO}$ structural isomers with respective predicted chemical shifts of ^{1}H NMR (combined in spectrum)

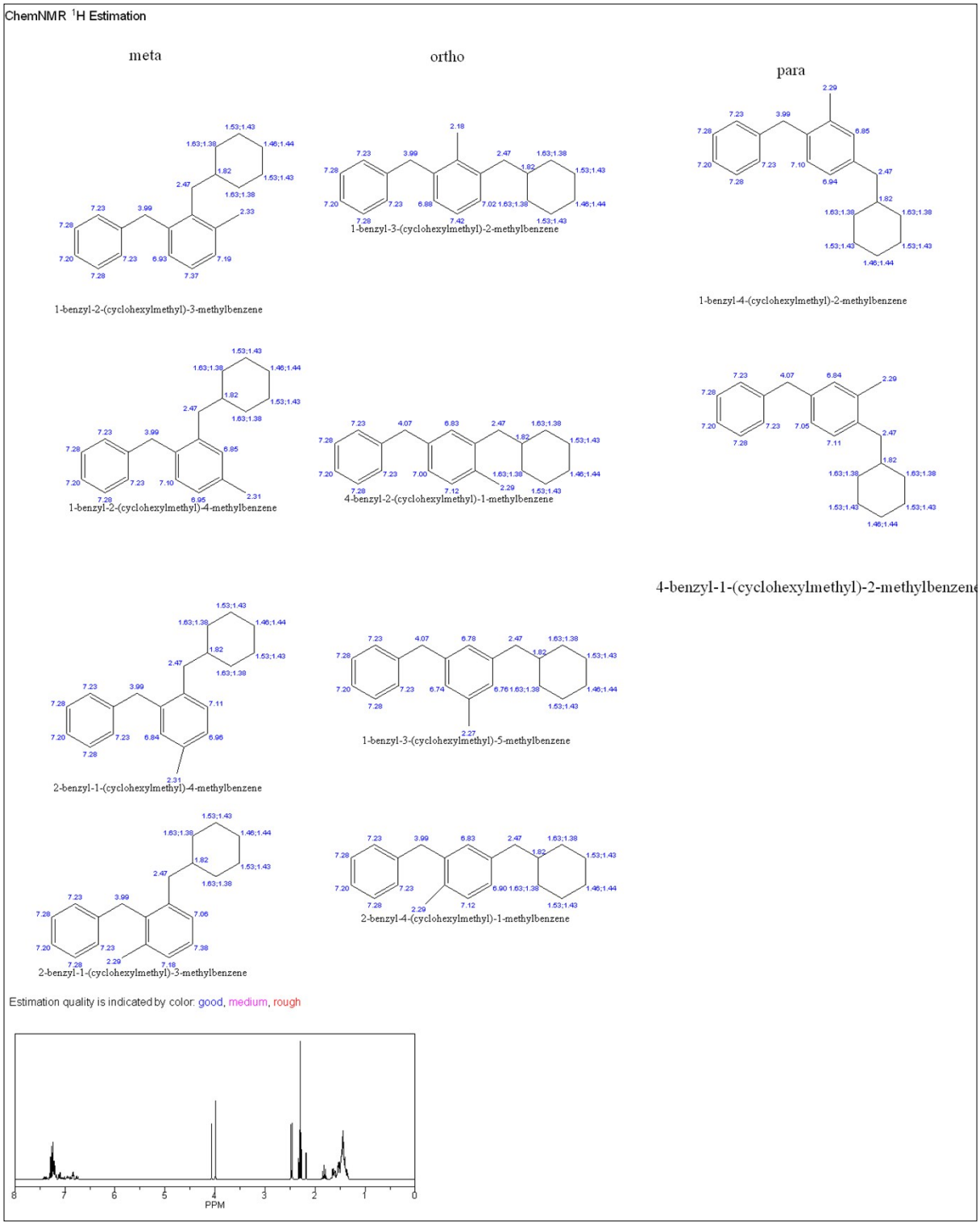

Figure S 2: All H6-DBT$_{OOX}$ structural isomers with respective predicted chemical shifts of ^{1}H NMR (combined in spectrum)

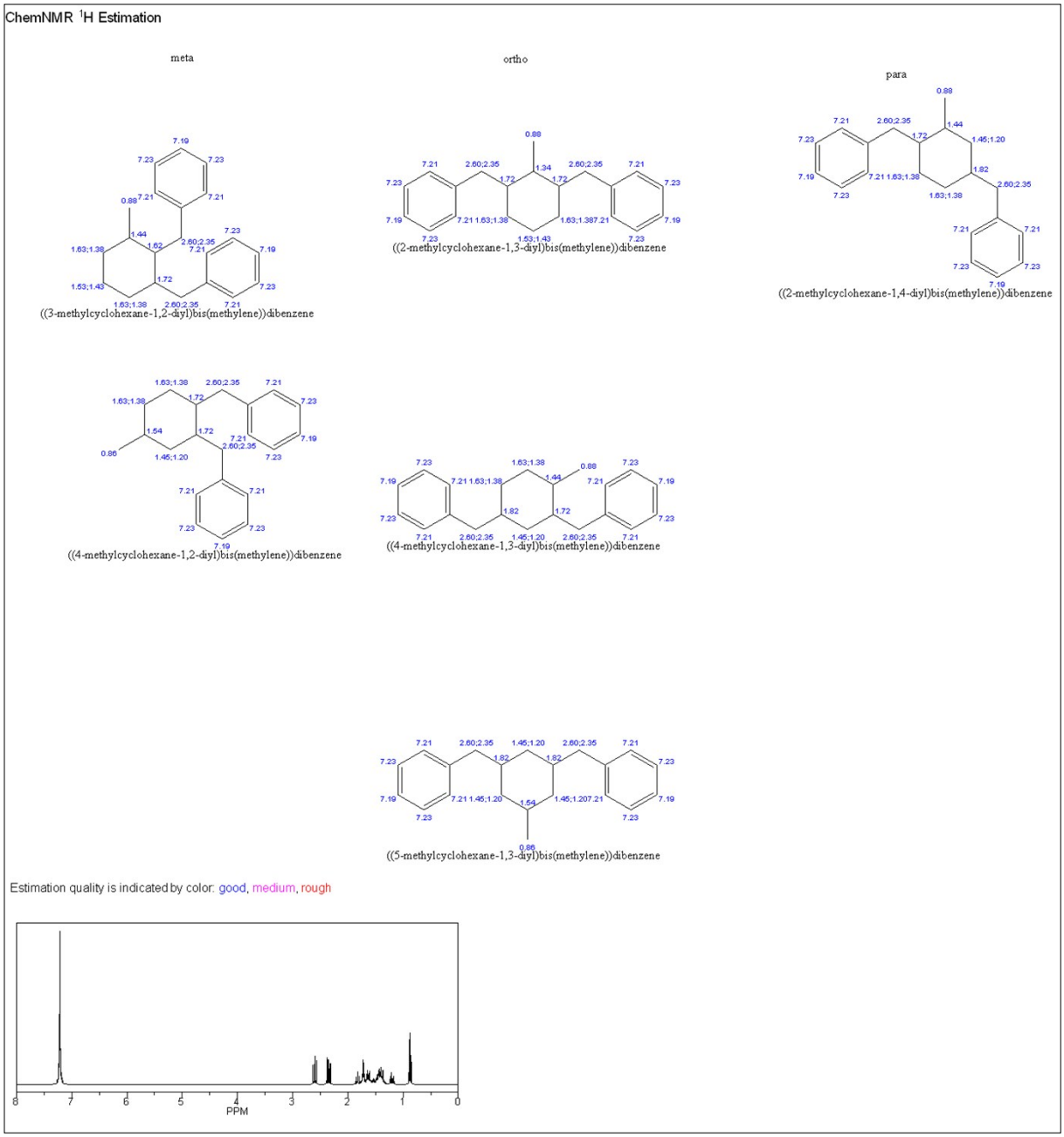

Figure S 3: All H6-DBT$_{OXO}$ structural isomers with respective predicted chemical shifts of ^{1}H NMR (combined in spectrum)

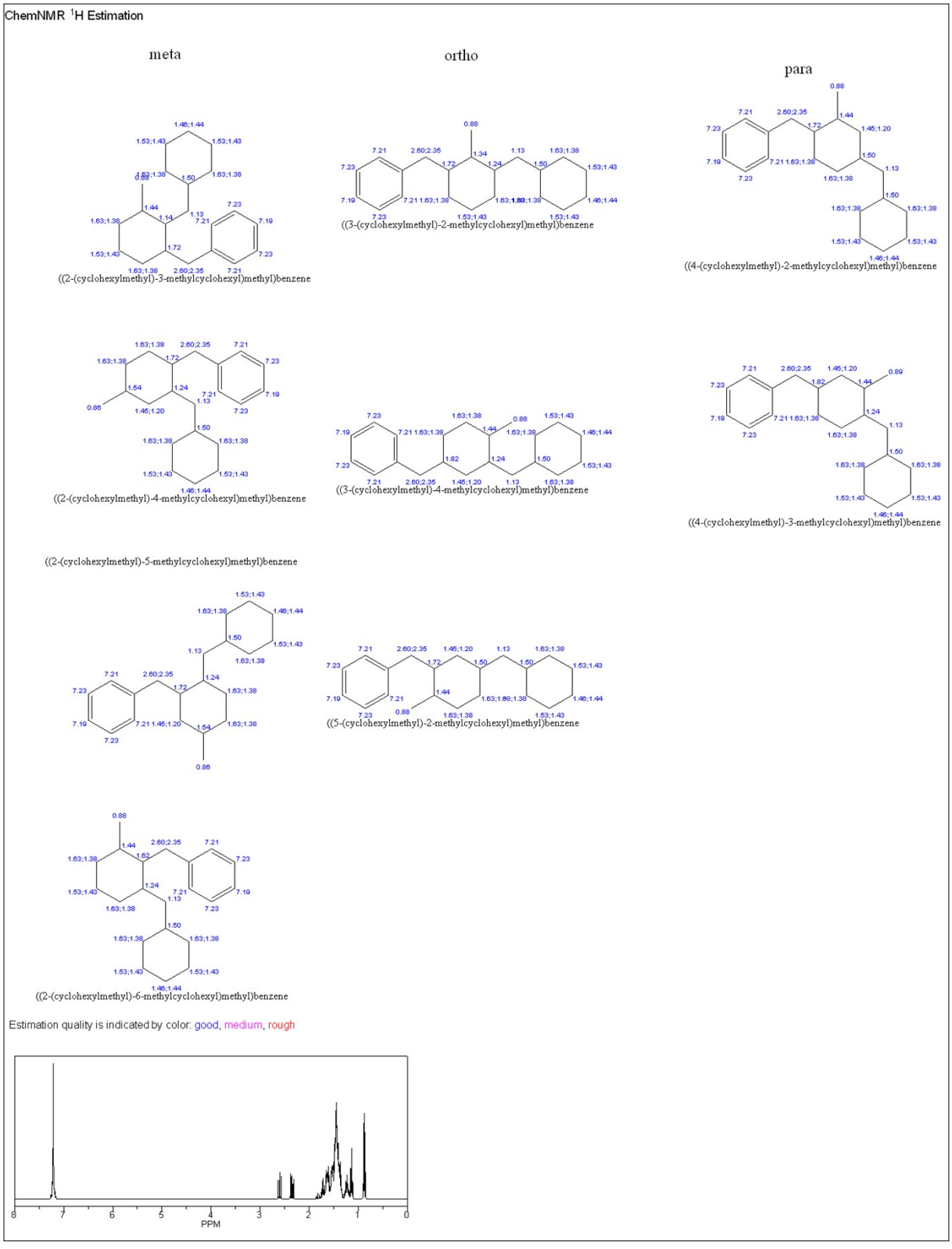

Figure S 4: All H12-DBT$_{OXX}$ structural isomers with respective predicted chemical shifts of ^{1}H NMR (combined in spectrum)

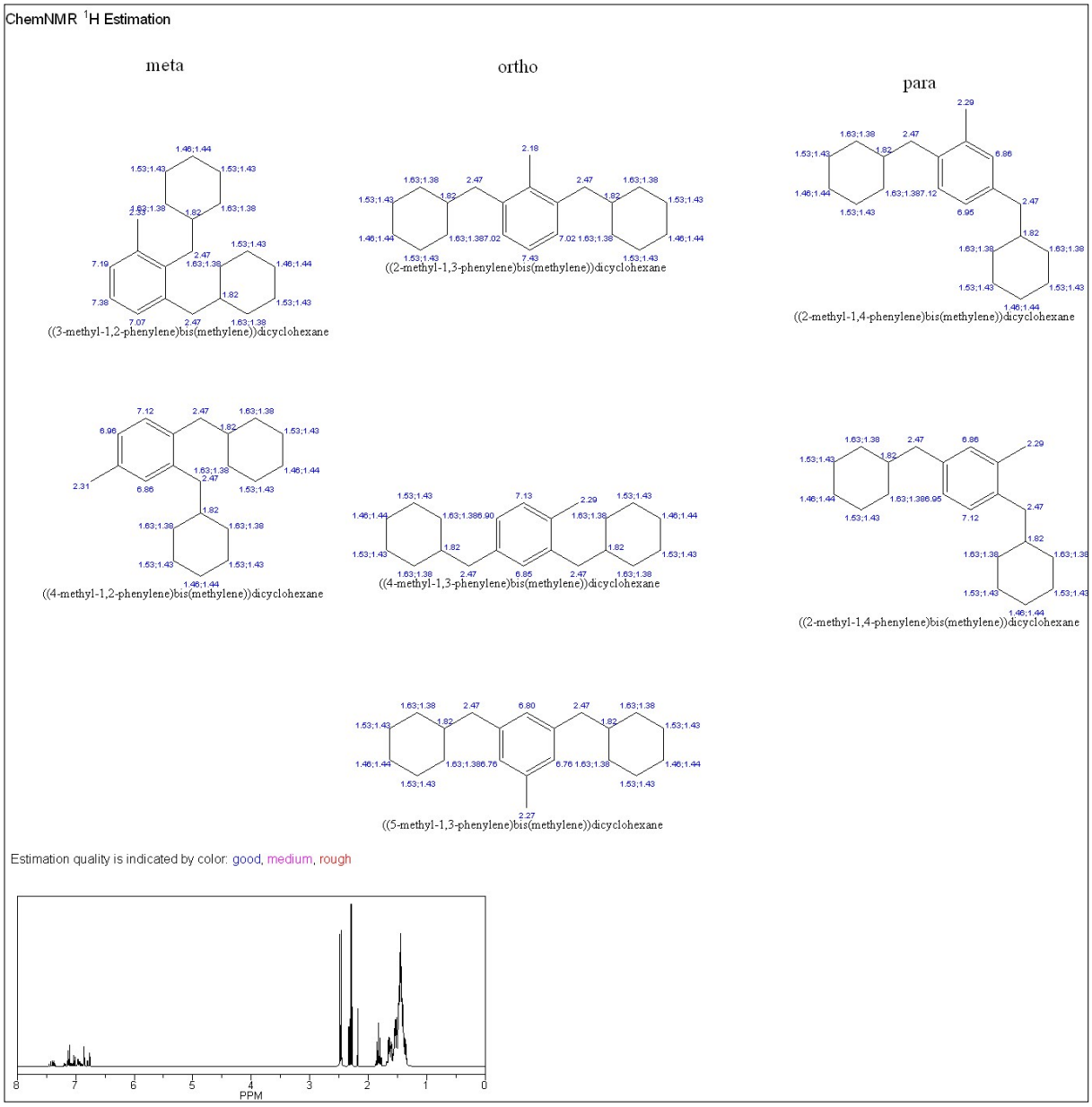

Figure S 5: All H12-DBT$_{XOX}$ structural isomers with respective predicted chemical shifts of ^{1}H NMR (combined in spectrum)

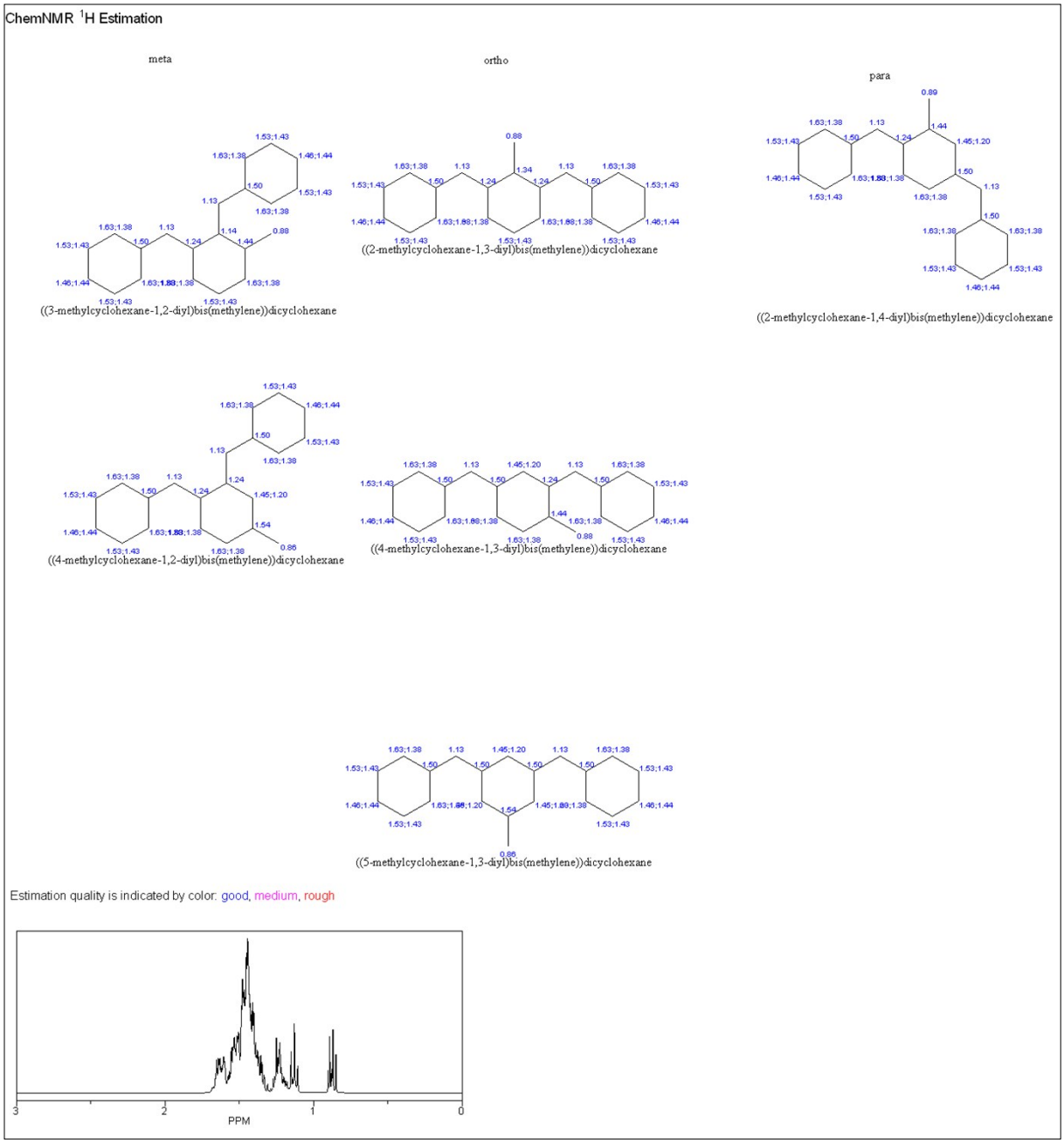

Figure S 6: All H12-DBT$_{XXX}$ structural isomers with respective predicted chemical shifts of ^{1}H NMR (combined in spectrum)

Experimental Data

T = 120 °C ; P = 50 bar

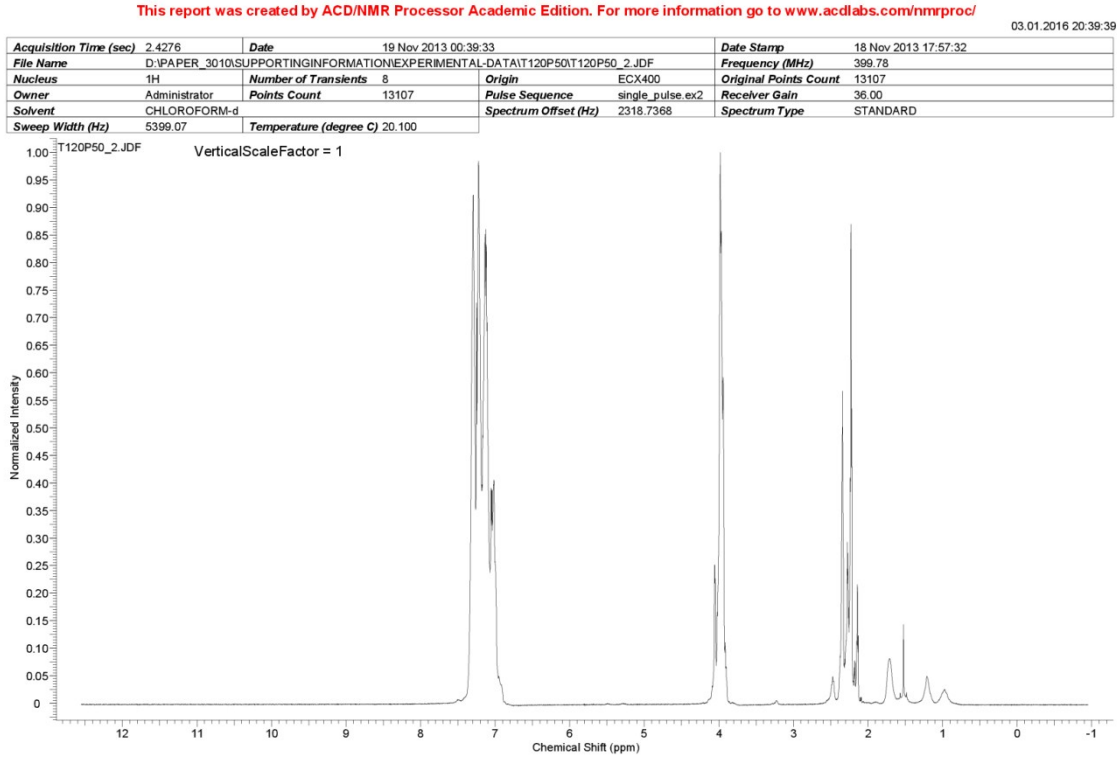

Figure S 7: Hydrogenation of Dibenzyltoluene t_{sample} = 2 min (T=120°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

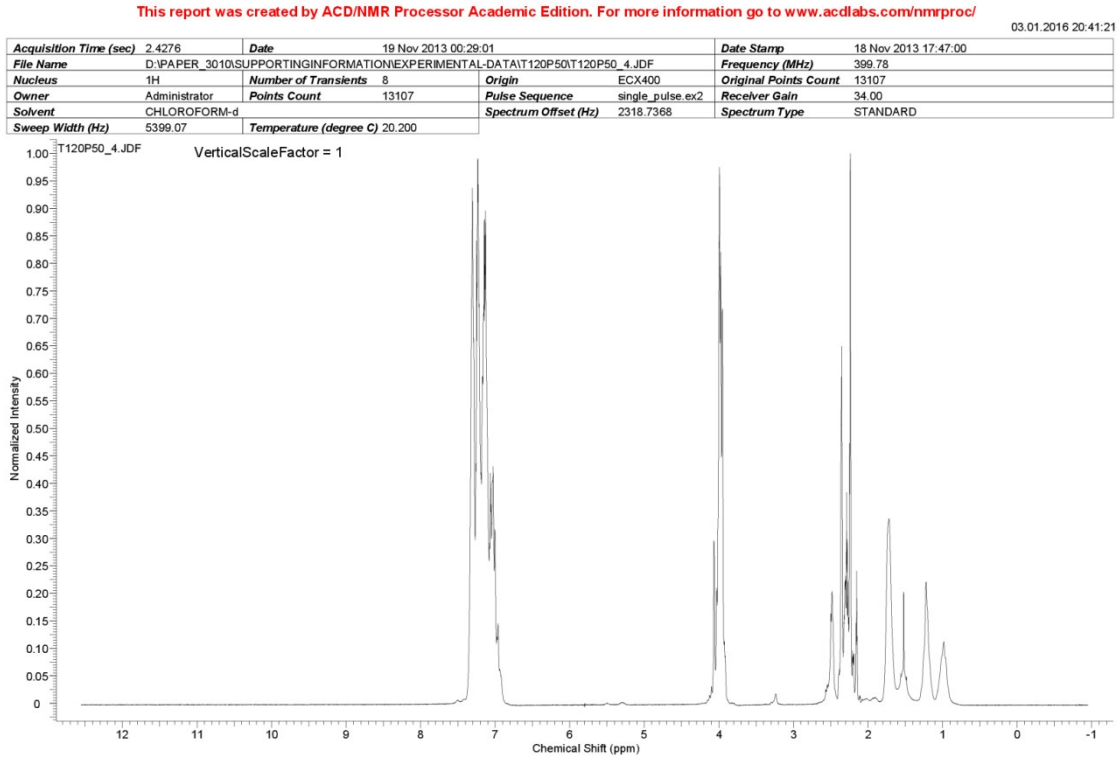

Figure S 8: Hydrogenation of Dibenzyltoluene t_{sample} = 4 min (T=120°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

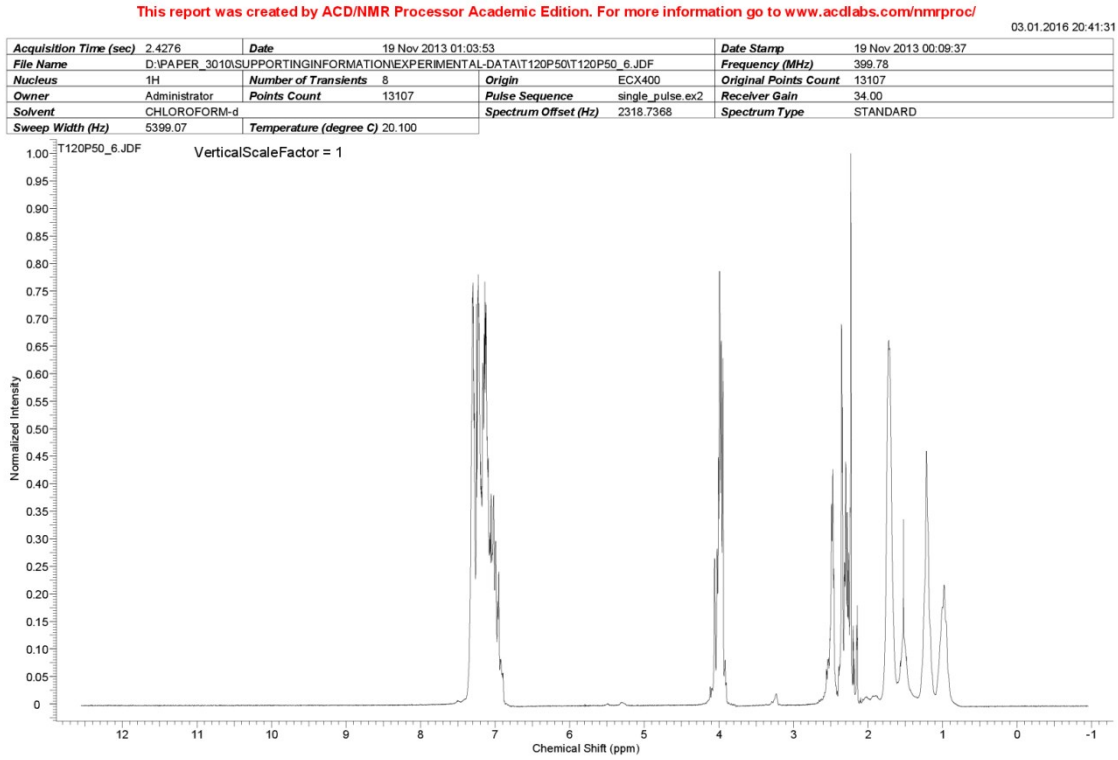

Figure S 9: Hydrogenation of Dibenzyltoluene t_{sample} = 6 min (T=120°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

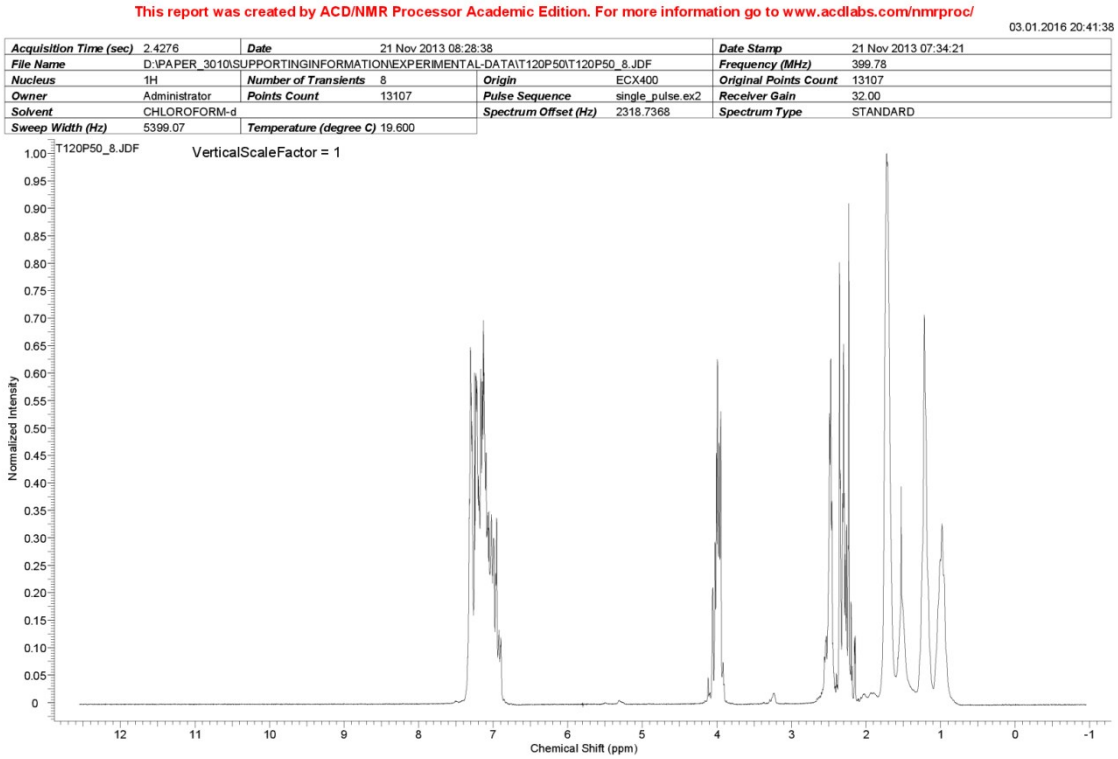

Figure S 10: Hydrogenation of Dibenzyltoluene t_{sample} = 8 min (T=120°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

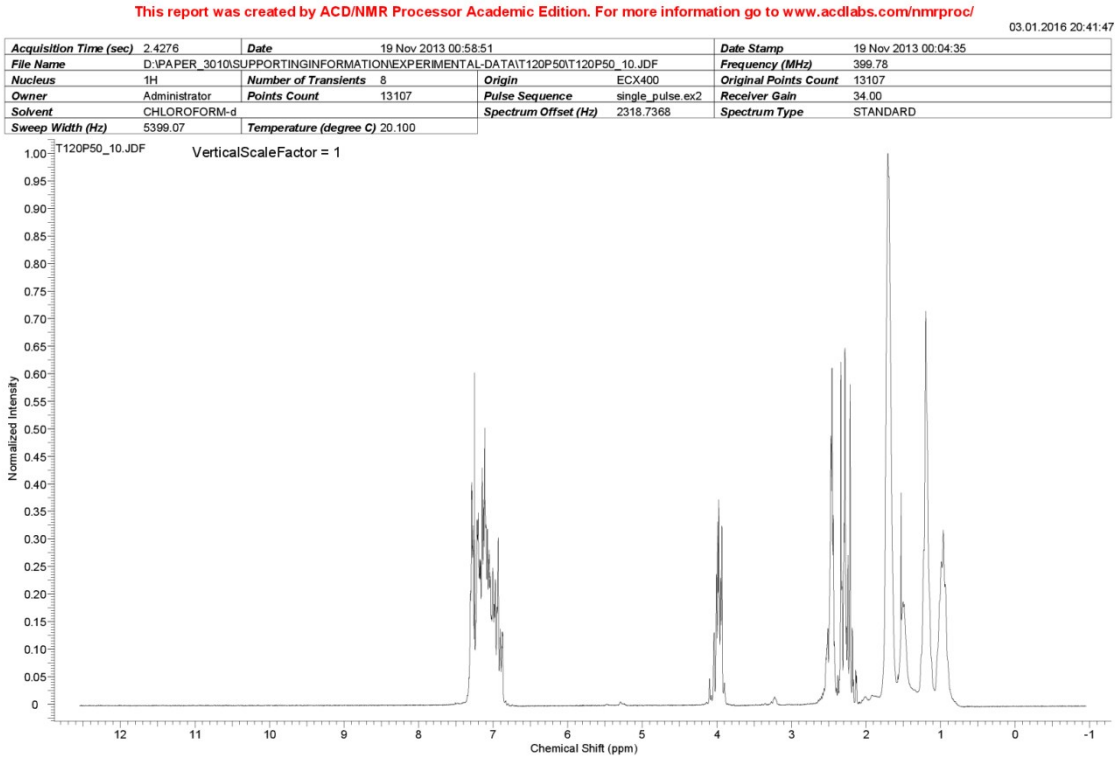

Figure S 11: Hydrogenation of Dibenzyltoluene t_{sample} = 10 min (T=120°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

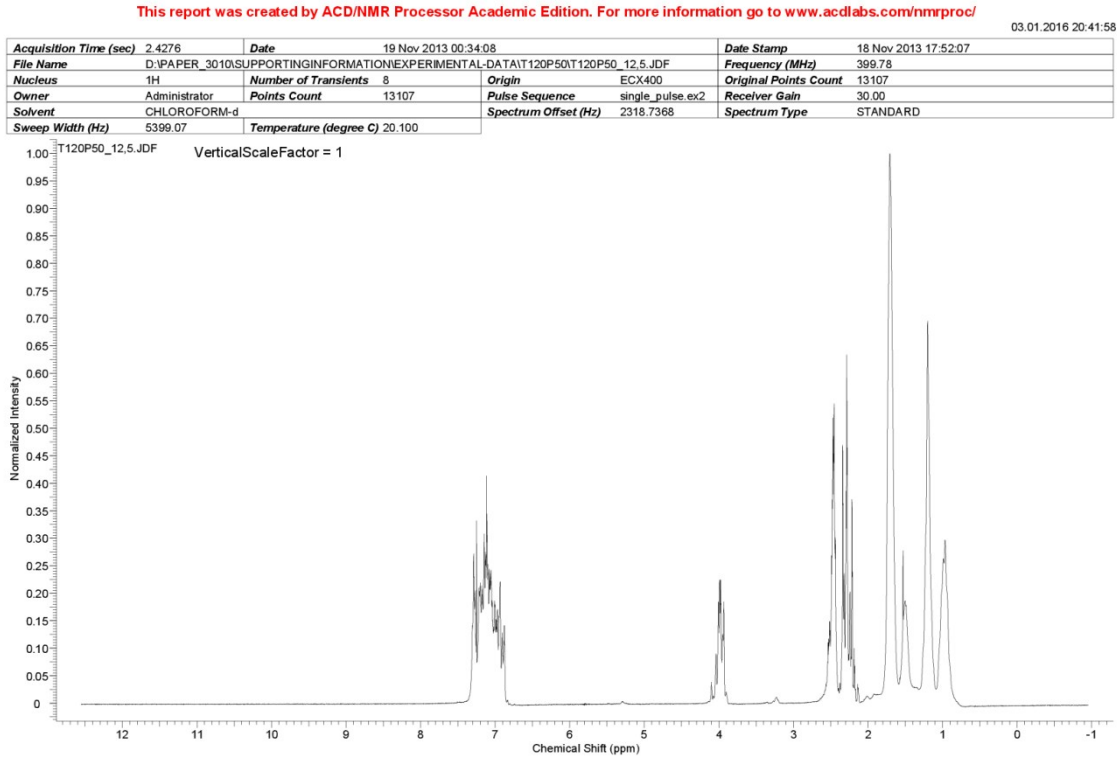

Figure S 12: Hydrogenation of Dibenzyltoluene t_{sample} = 12.5 min (T=120°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

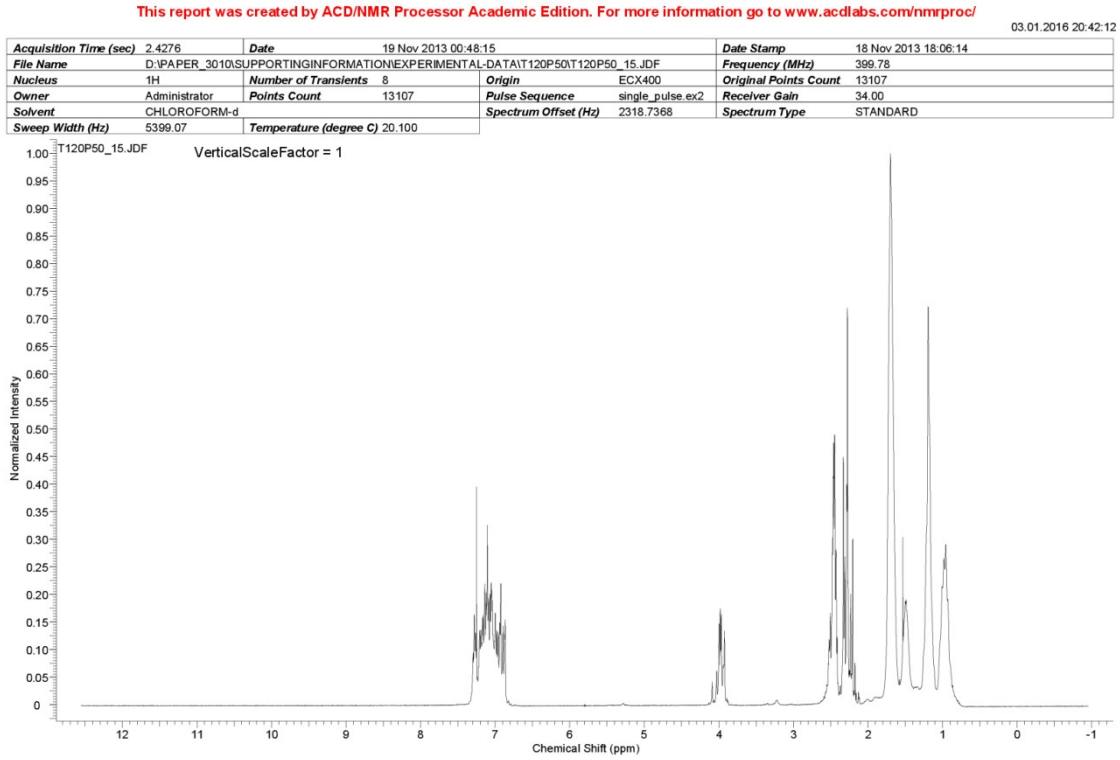

Figure S 13: Hydrogenation of Dibenzyltoluene t_{sample} = 15 min (T=120°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

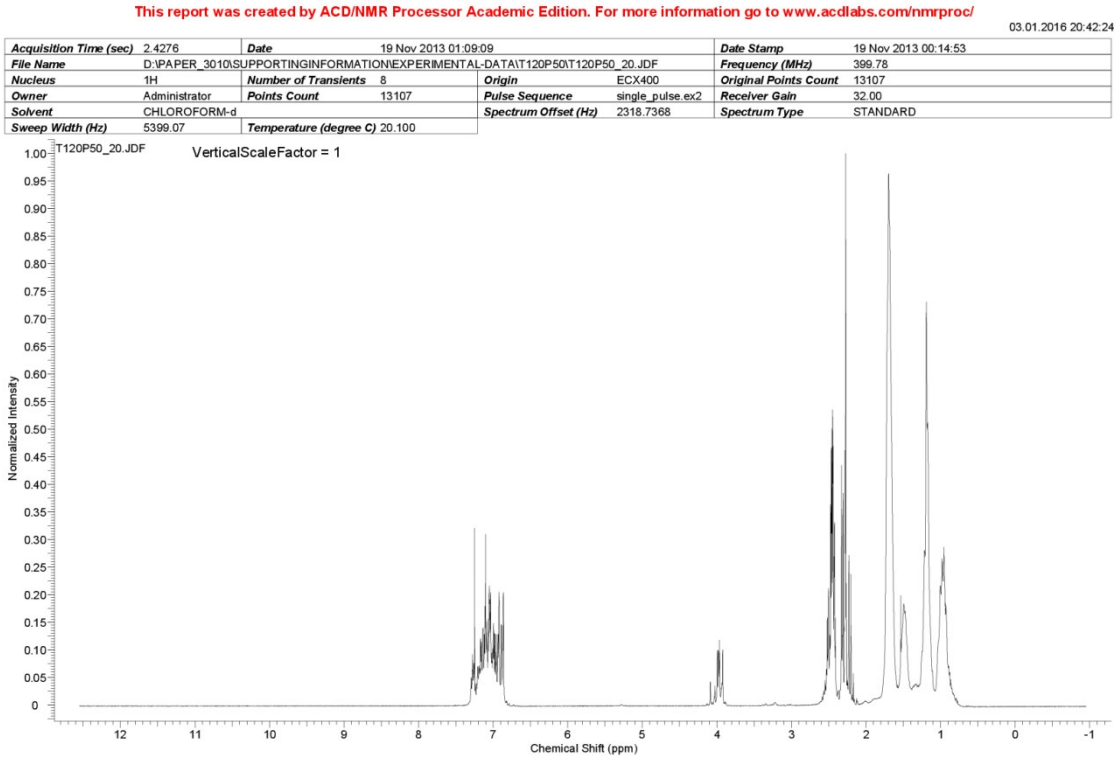

Figure S 14: Hydrogenation of Dibenzyltoluene t_{sample} = 20 min (T=120°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

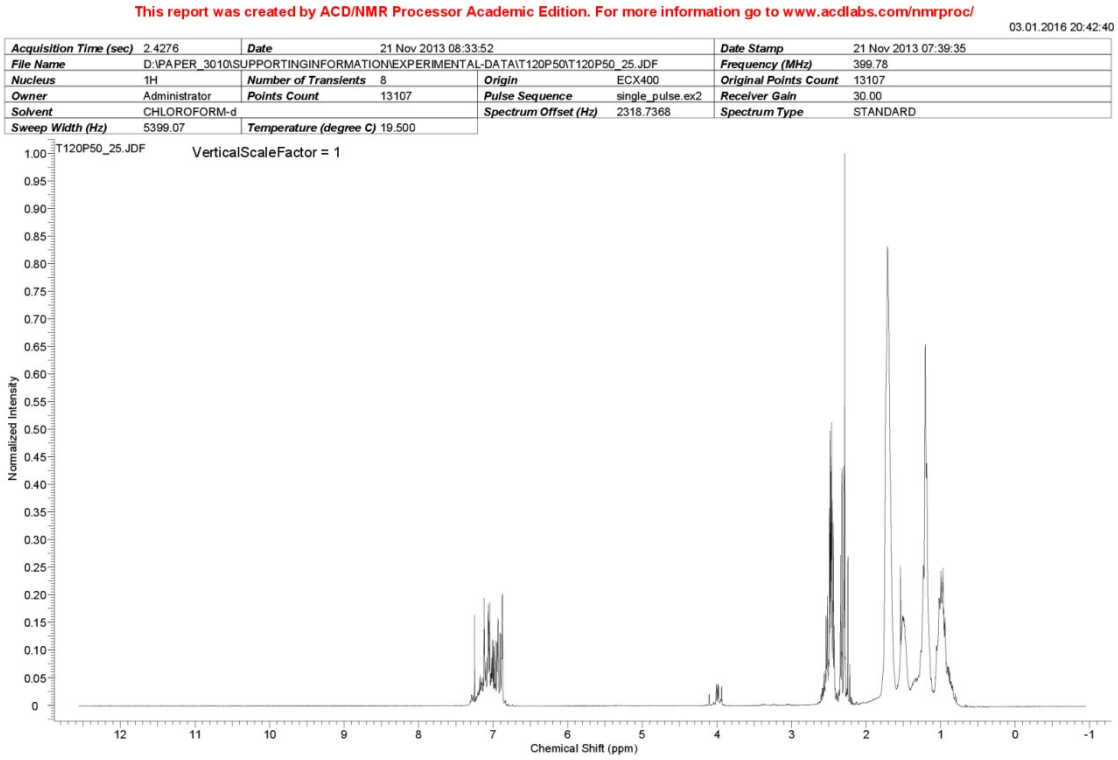

Figure S 15: Hydrogenation of Dibenzyltoluene t_{sample} = 25 min (T=120°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

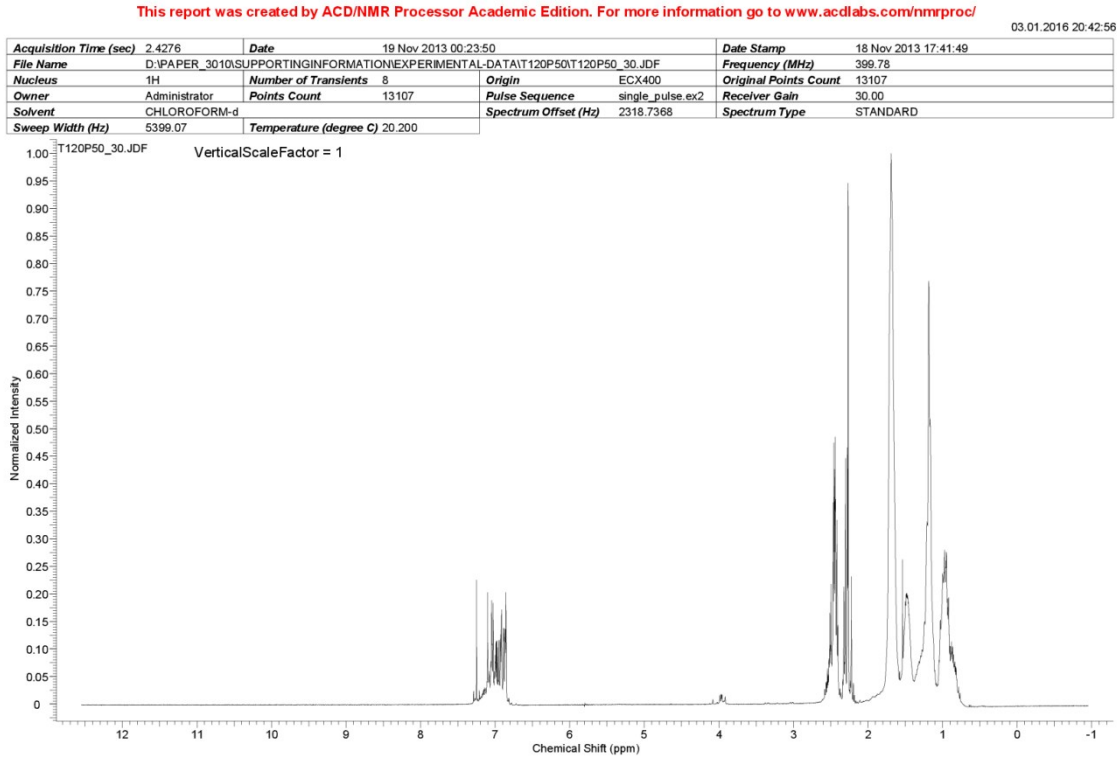

Figure S 16: Hydrogenation of Dibenzyltoluene t_{sample} = 30 min (T=120°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

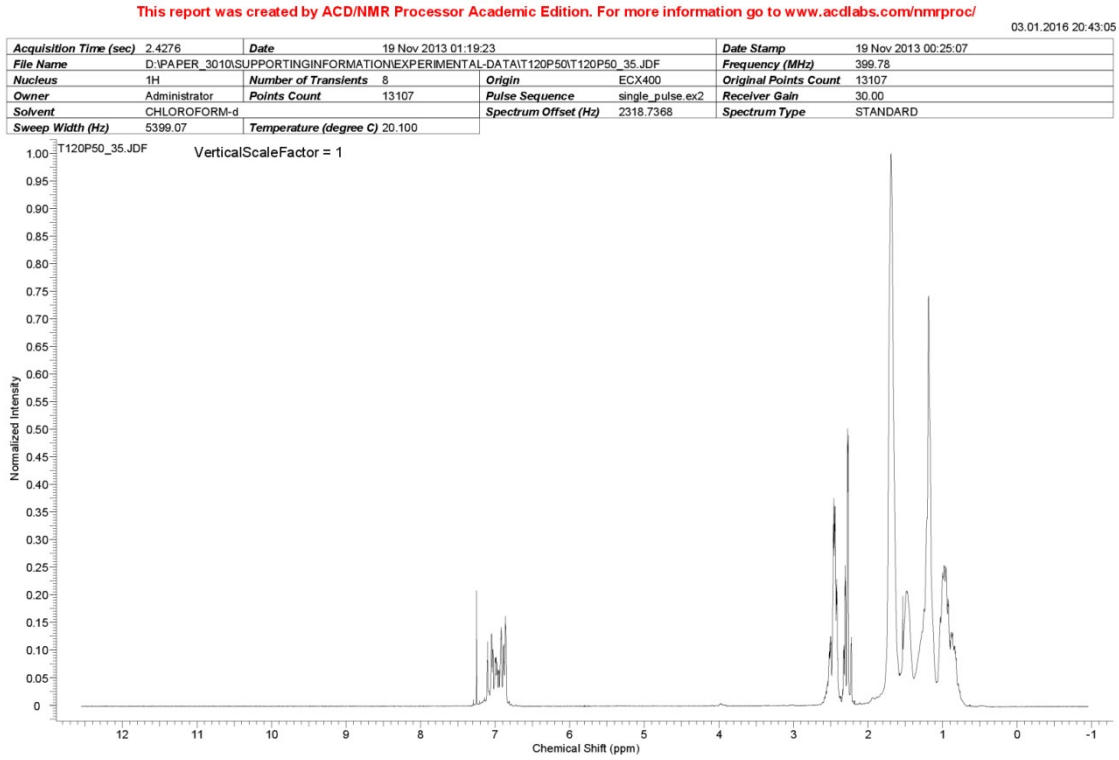

Figure S 17: Hydrogenation of Dibenzyltoluene t_{sample} = 35 min (T=120°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

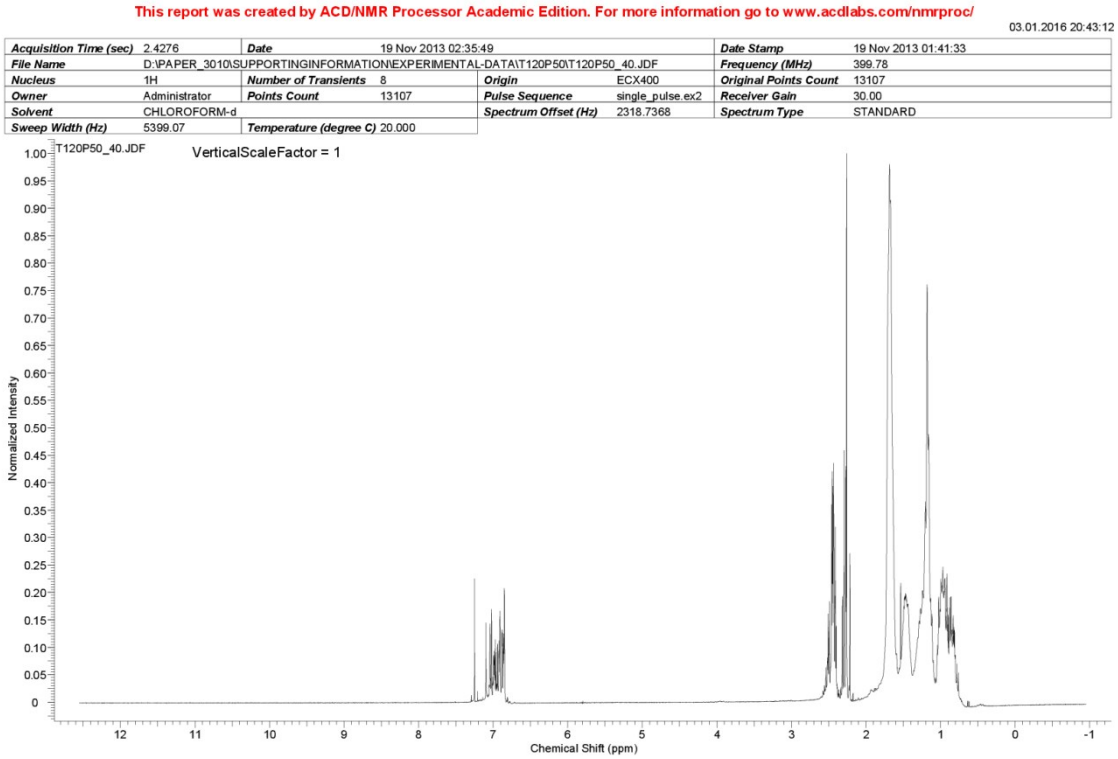

Figure S 18: Hydrogenation of Dibenzyltoluene t_{sample} = 40 min (T=120°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

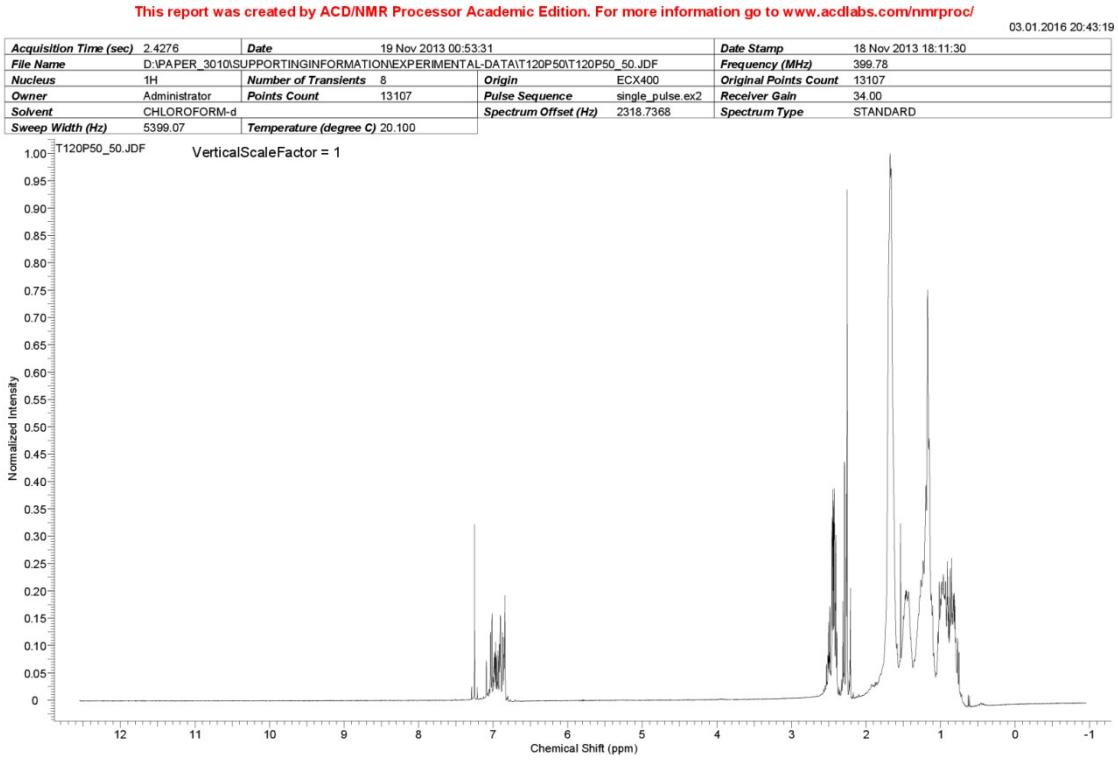

Figure S 19: Hydrogenation of Dibenzyltoluene t_{sample} = 50 min (T=120°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

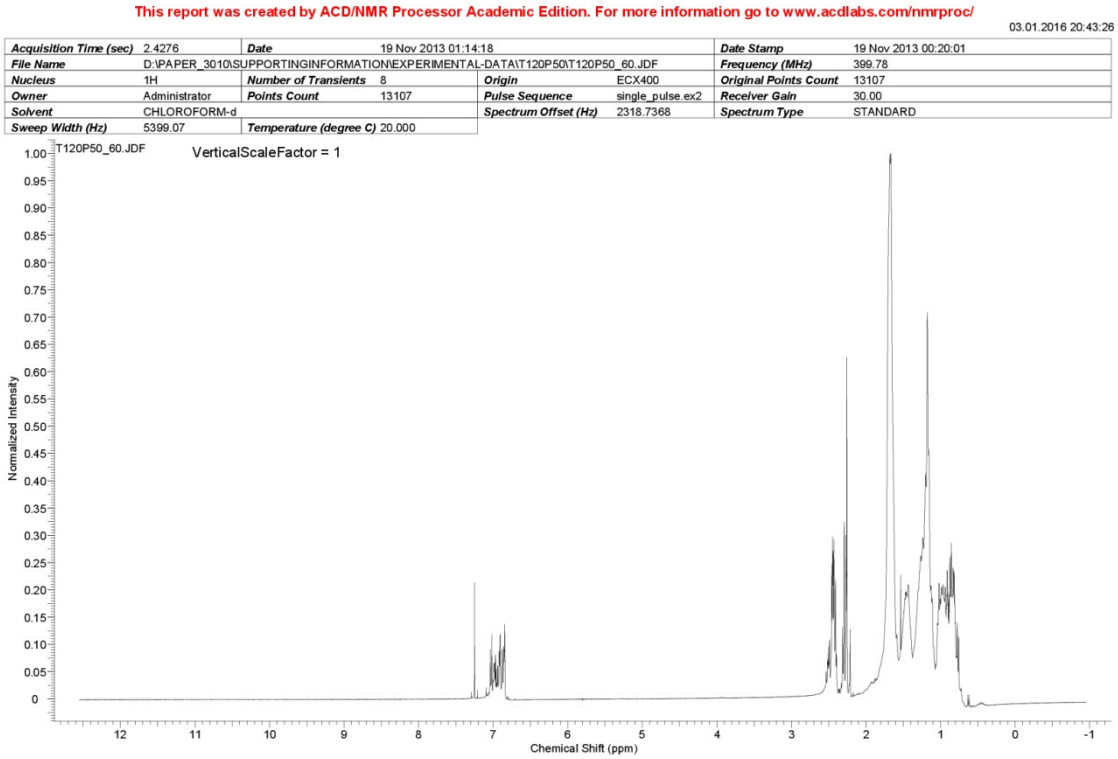

Figure S 20: Hydrogenation of Dibenzyltoluene t_{sample} = 60 min (T=120°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

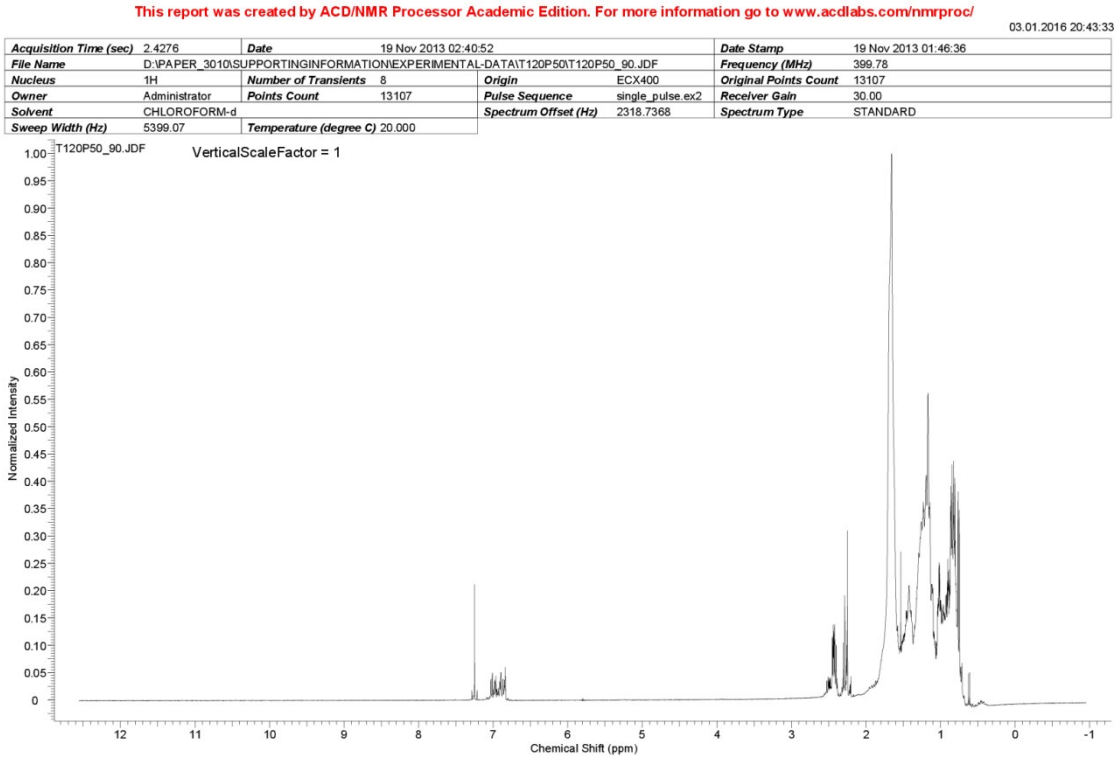

Figure S 21: Hydrogenation of Dibenzyltoluene t_{sample} = 90 min (T=120°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

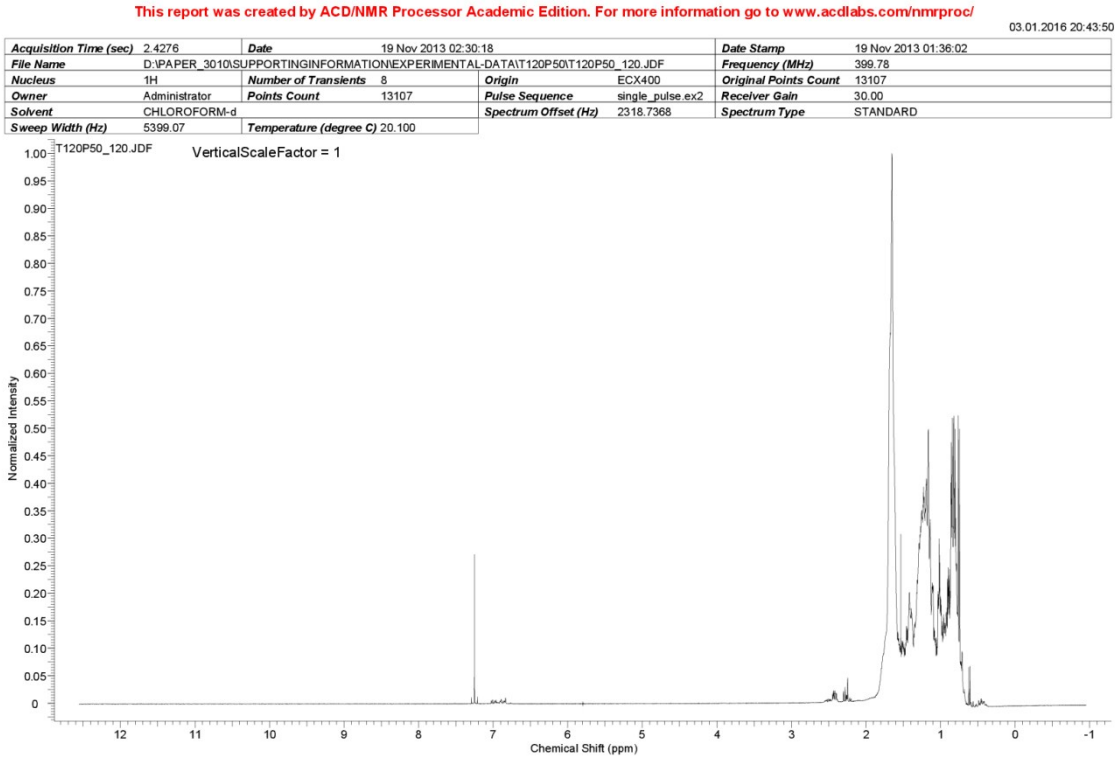

Figure S 22: Hydrogenation of Dibenzyltoluene t_{sample} = 120 min (T=120°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

T = 140 °C ; P = 50 bar

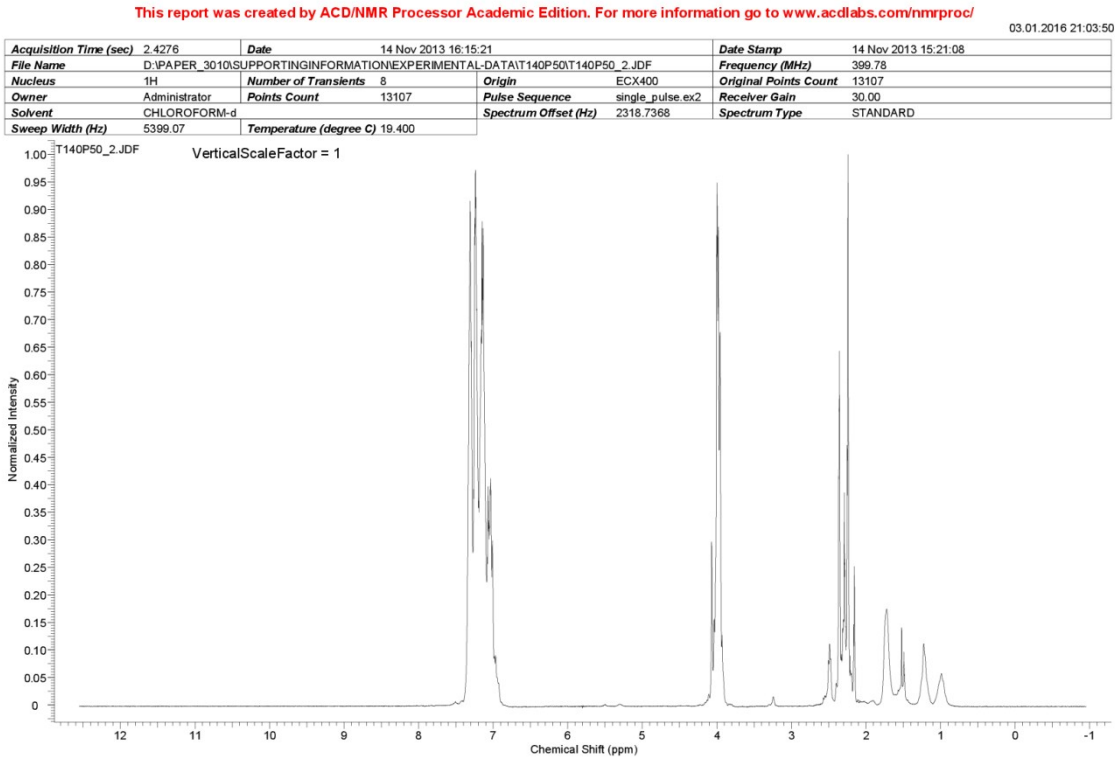

Figure S 23: Hydrogenation of Dibenzyltoluene t_{sample} = 2 min (T=140°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

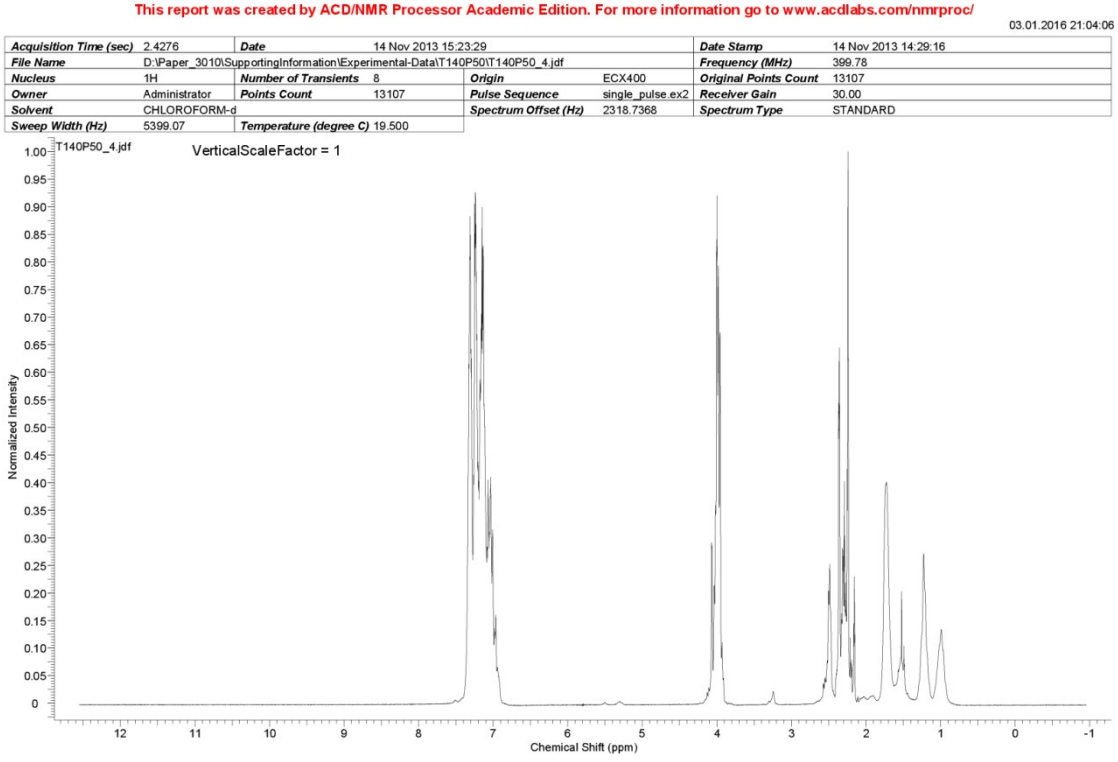

Figure S 24: Hydrogenation of Dibenzyltoluene t_{sample} = 4 min (T=140°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

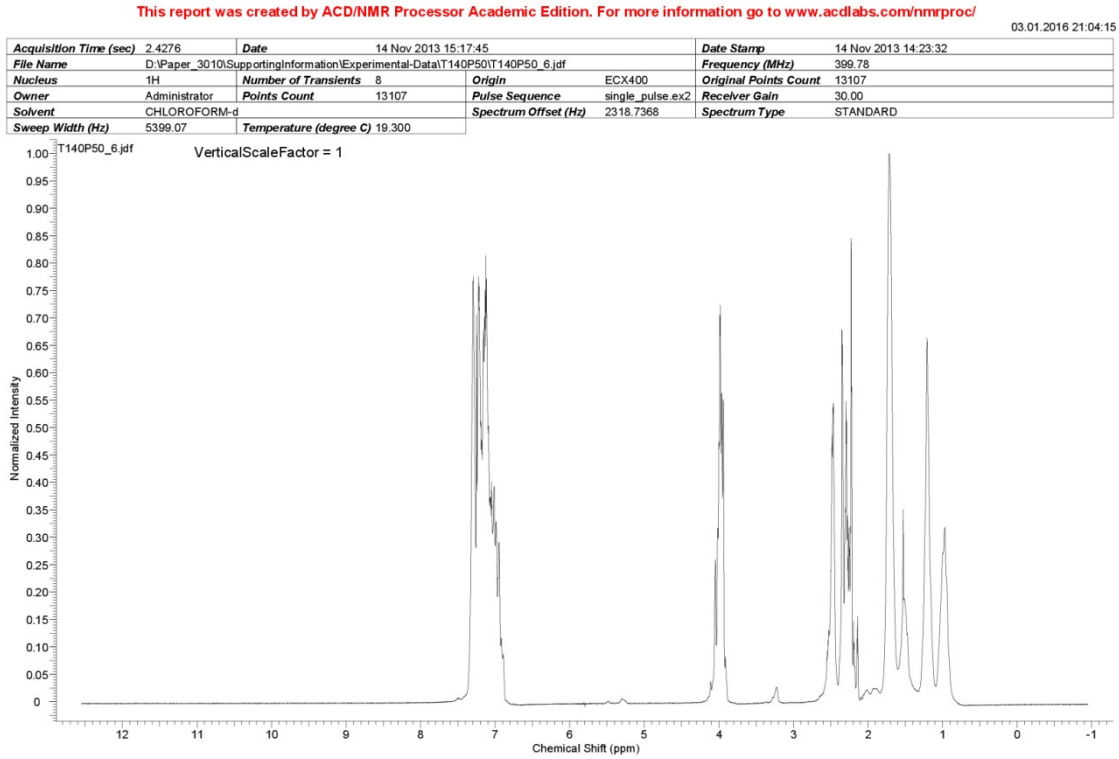

Figure S 25: Hydrogenation of Dibenzyltoluene t_{sample} = 6 min (T=140°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

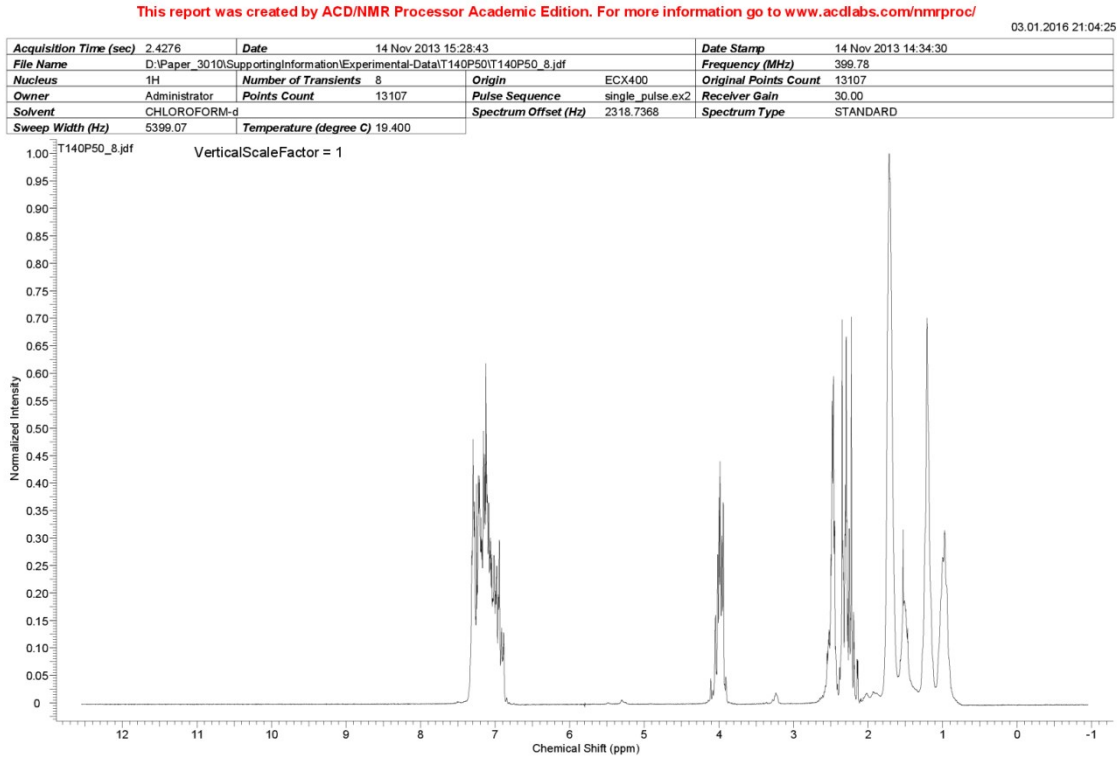

Figure S 26: Hydrogenation of Dibenzyltoluene t_{sample} = 8 min (T=140°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

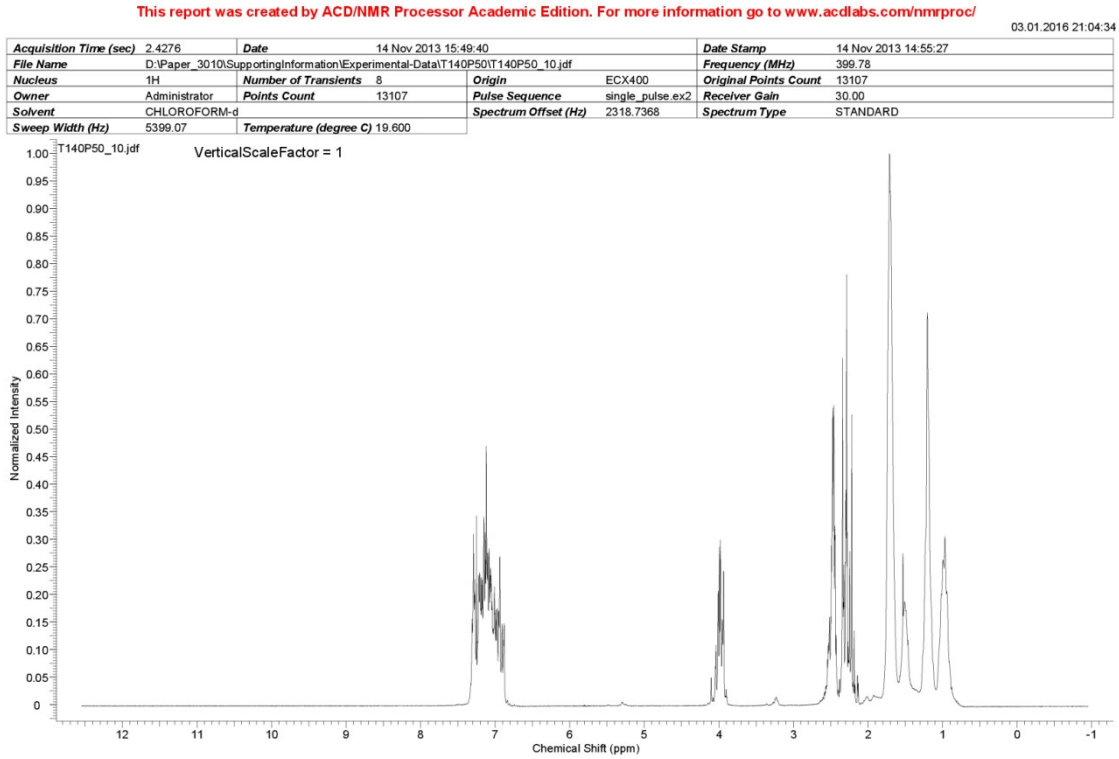

Figure S 27: Hydrogenation of Dibenzyltoluene t_{sample} = 10 min (T=140°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

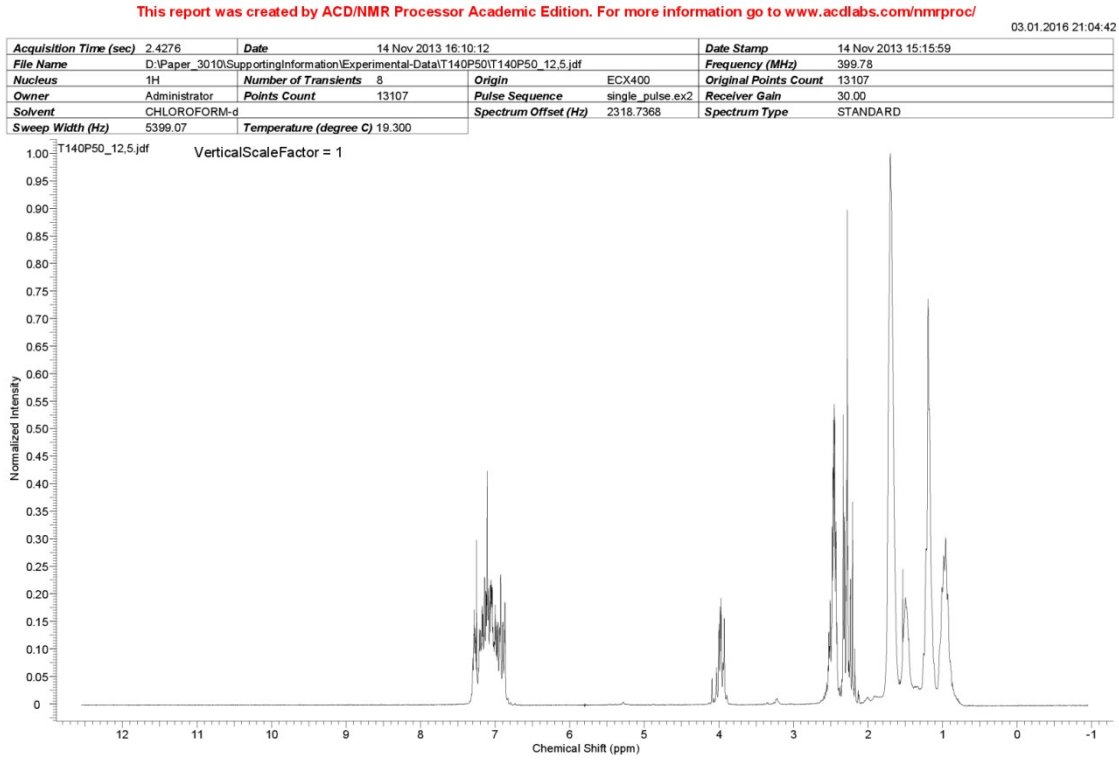

Figure S 28: Hydrogenation of Dibenzyltoluene t_{sample} = 12.5 min (T=140°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

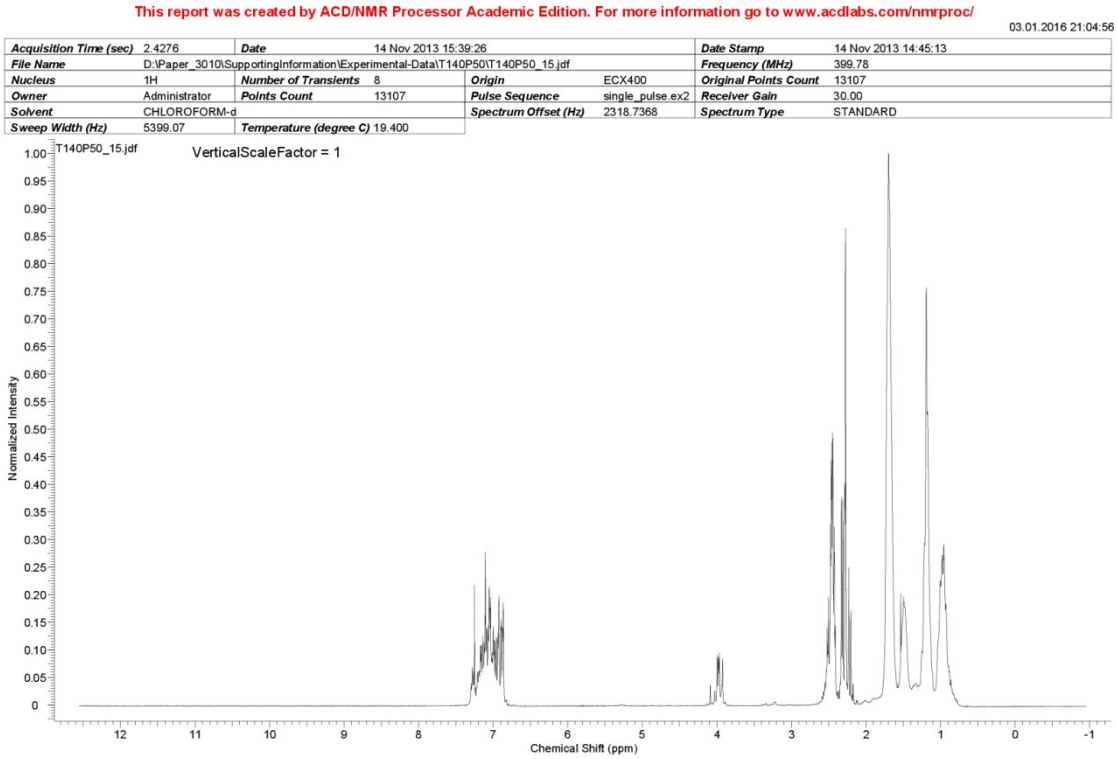

Figure S 29: Hydrogenation of Dibenzyltoluene t_{sample} = 15 min (T=140°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

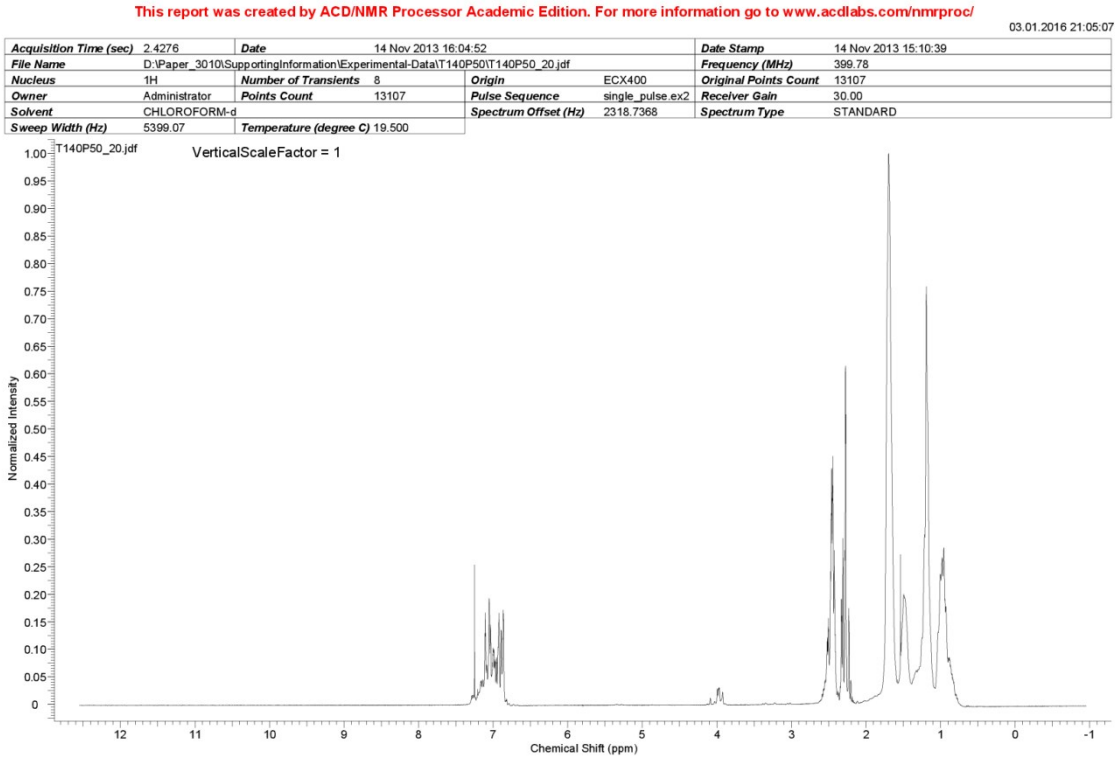

Figure S 30: Hydrogenation of Dibenzyltoluene t_{sample} = 20min (T=140°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

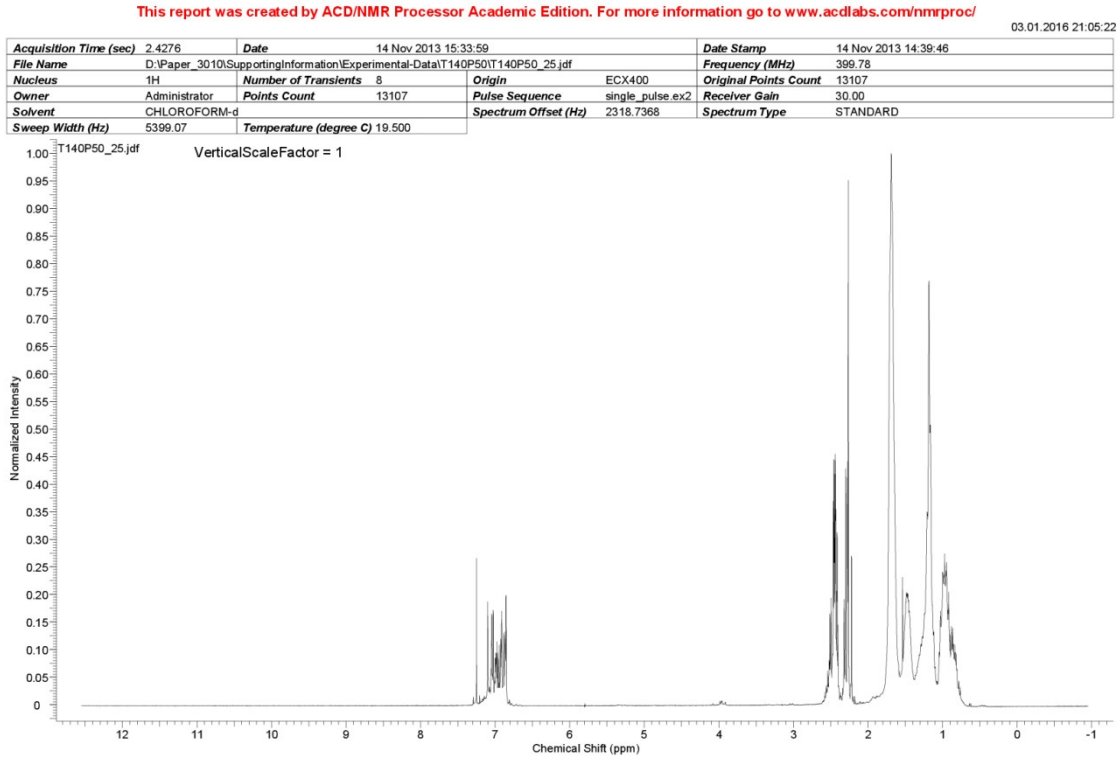

Figure S 31: Hydrogenation of Dibenzyltoluene t_{sample} = 25 min (T=140°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

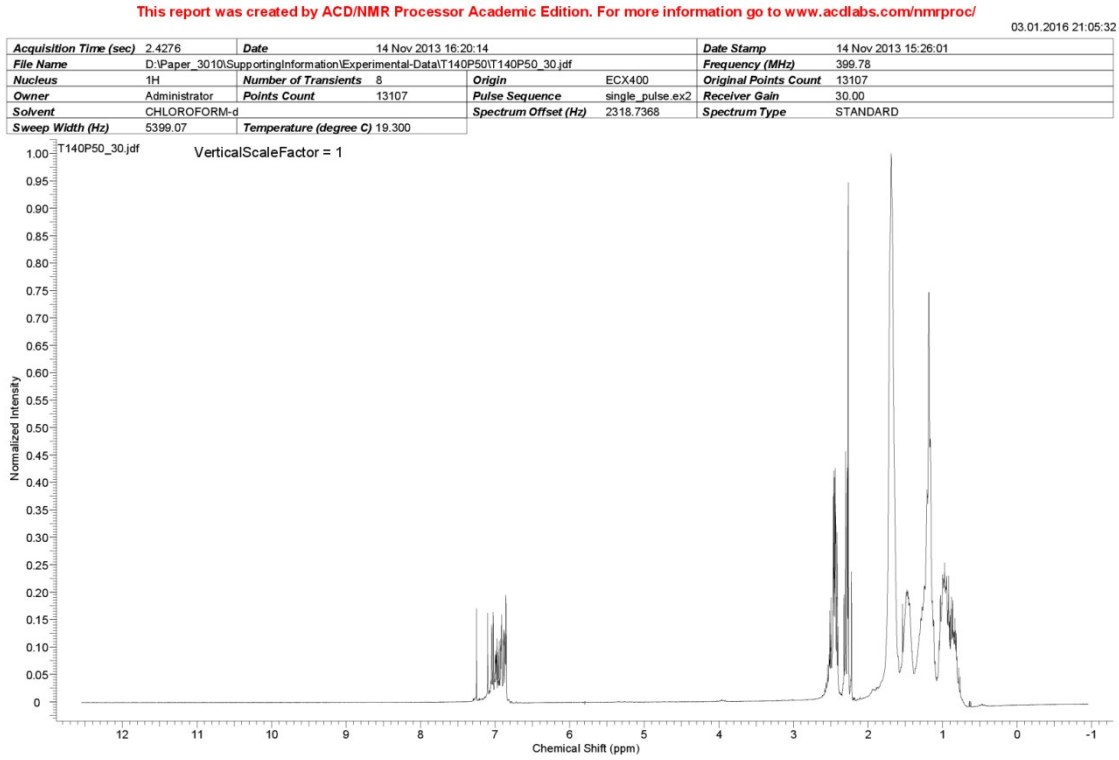

Figure S 32: Hydrogenation of Dibenzyltoluene t_{sample} = 30 min (T=140°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

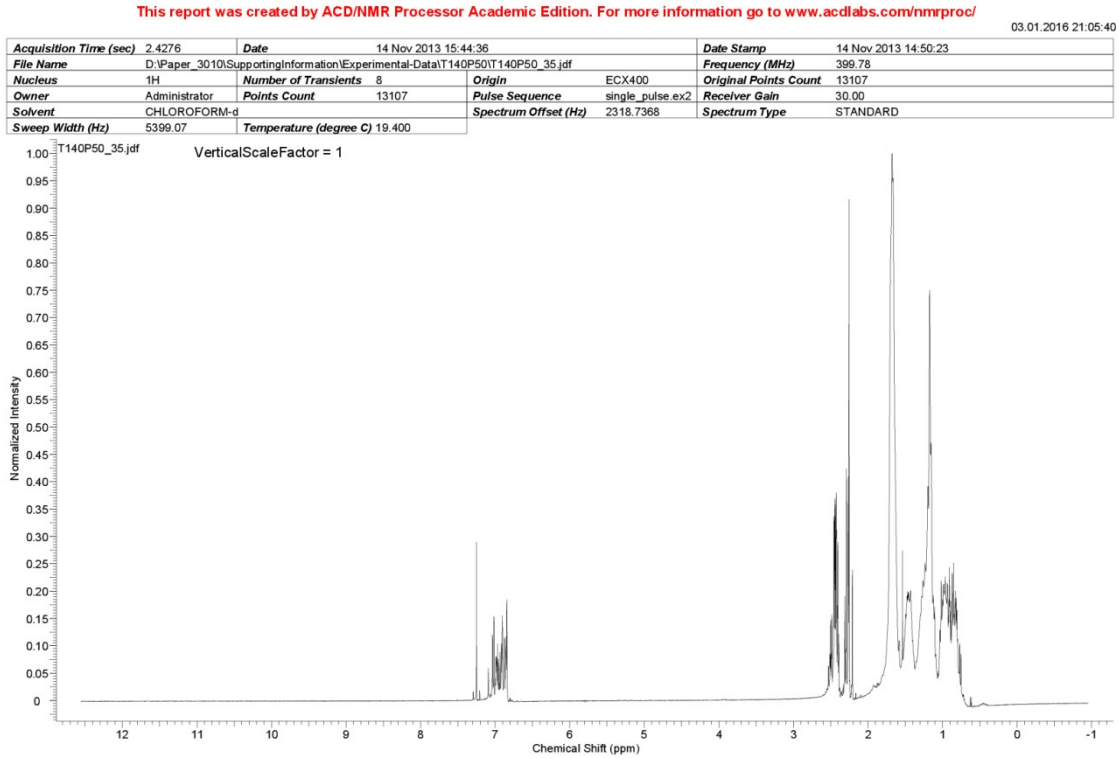

Figure S 33: Hydrogenation of Dibenzyltoluene t_{sample} = 35 min (T=140°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

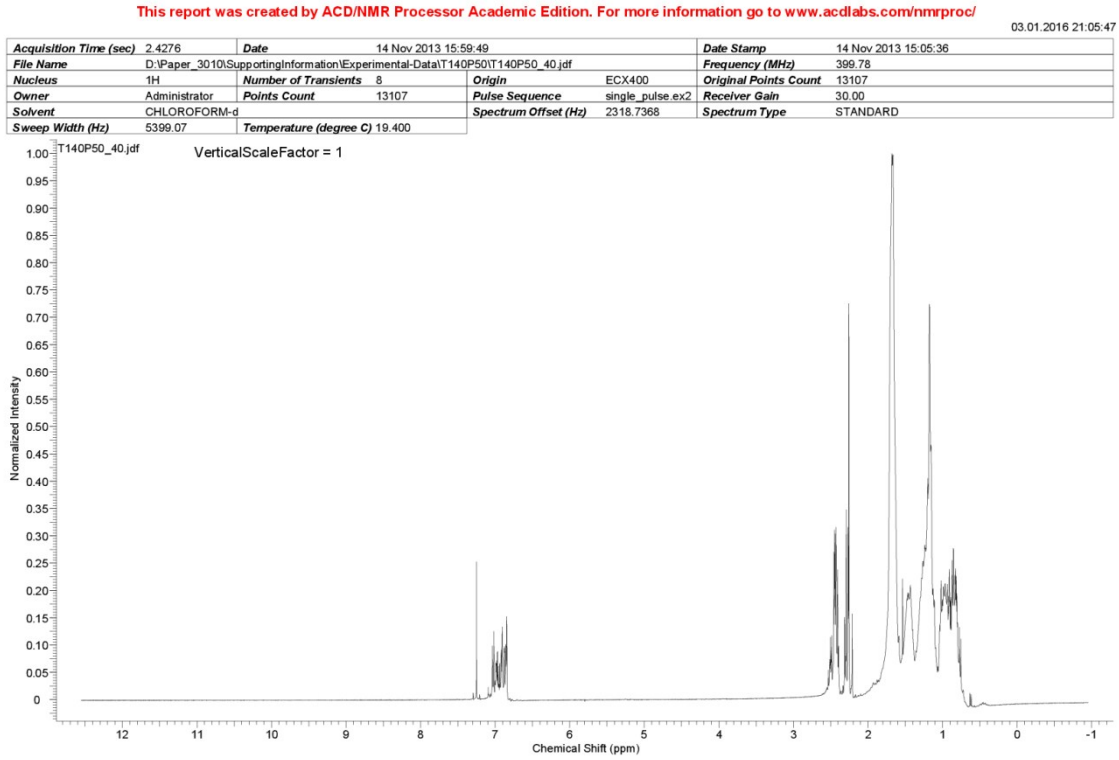

Figure S 34: Hydrogenation of Dibenzyltoluene t_{sample} = 40 min (T=140°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

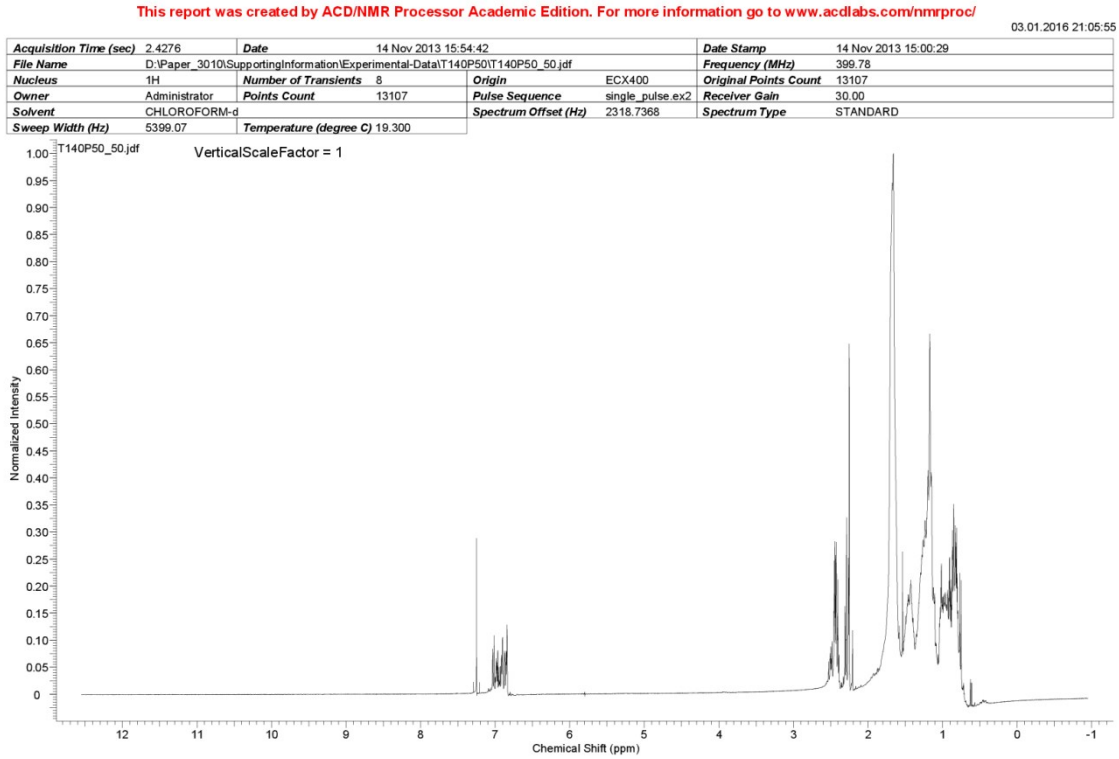

Figure S 35: Hydrogenation of Dibenzyltoluene t_{sample} = 50 min (T=140°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

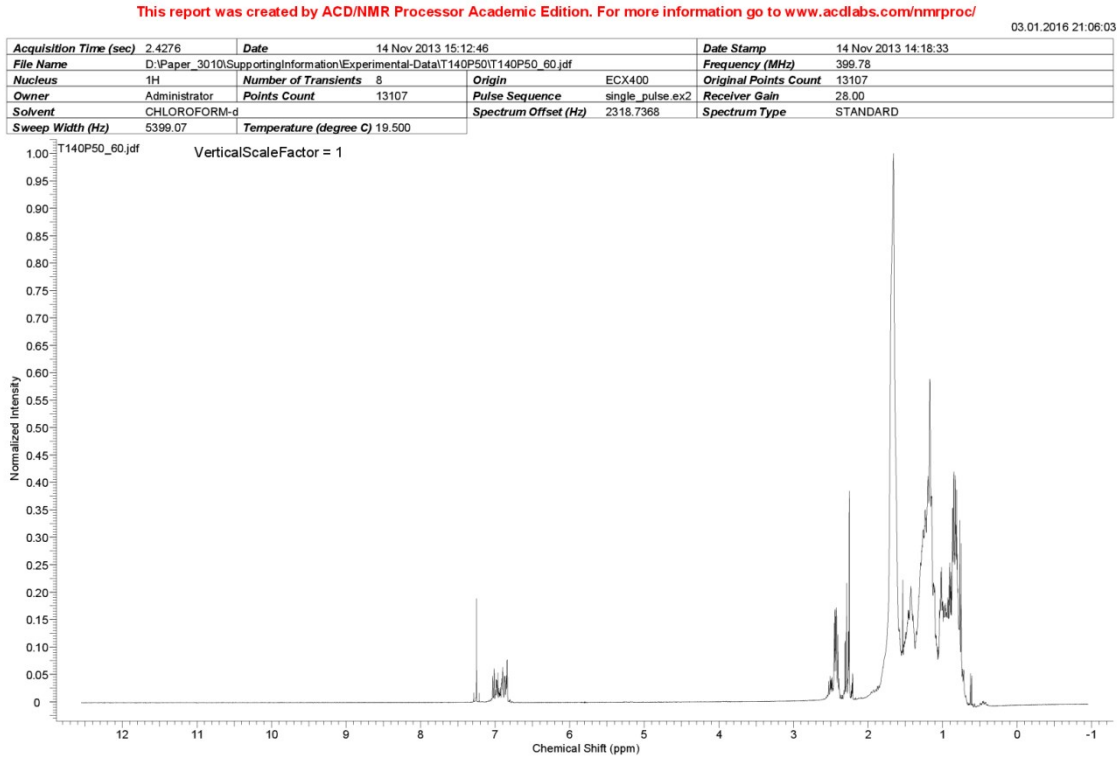

Figure S 36: Hydrogenation of Dibenzyltoluene t_{sample} = 60 min (T=140°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

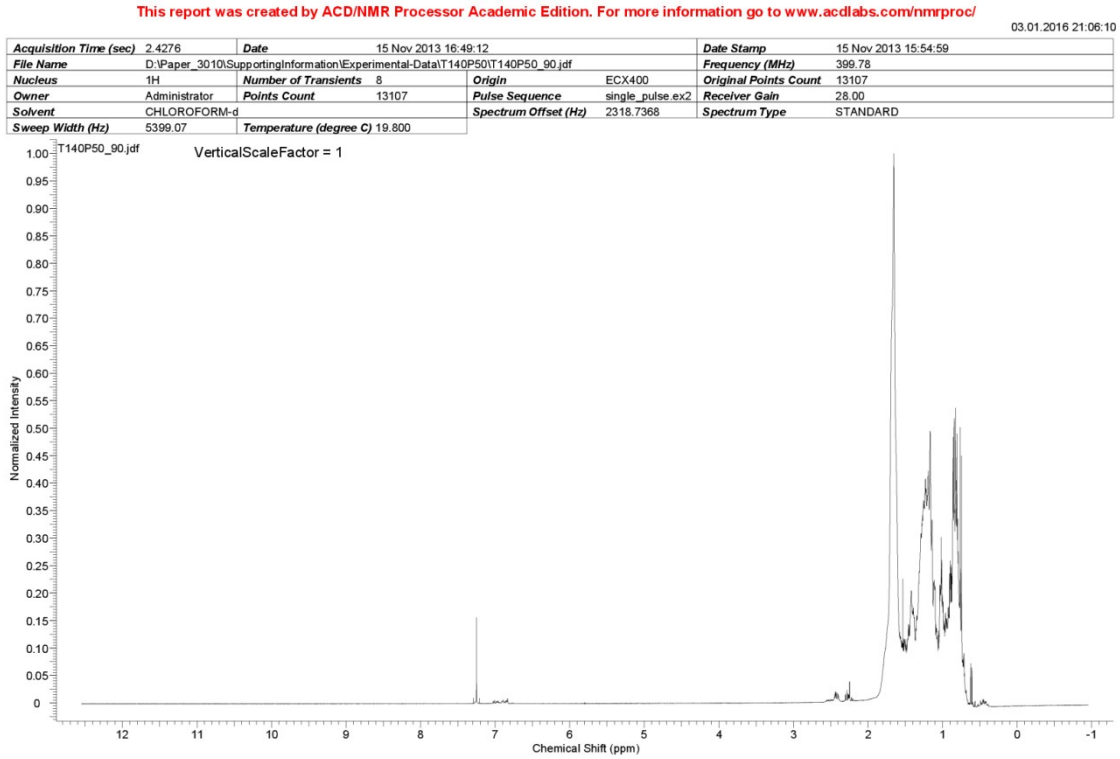

Figure S 37: Hydrogenation of Dibenzyltoluene t_{sample} = 90 min (T=140°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

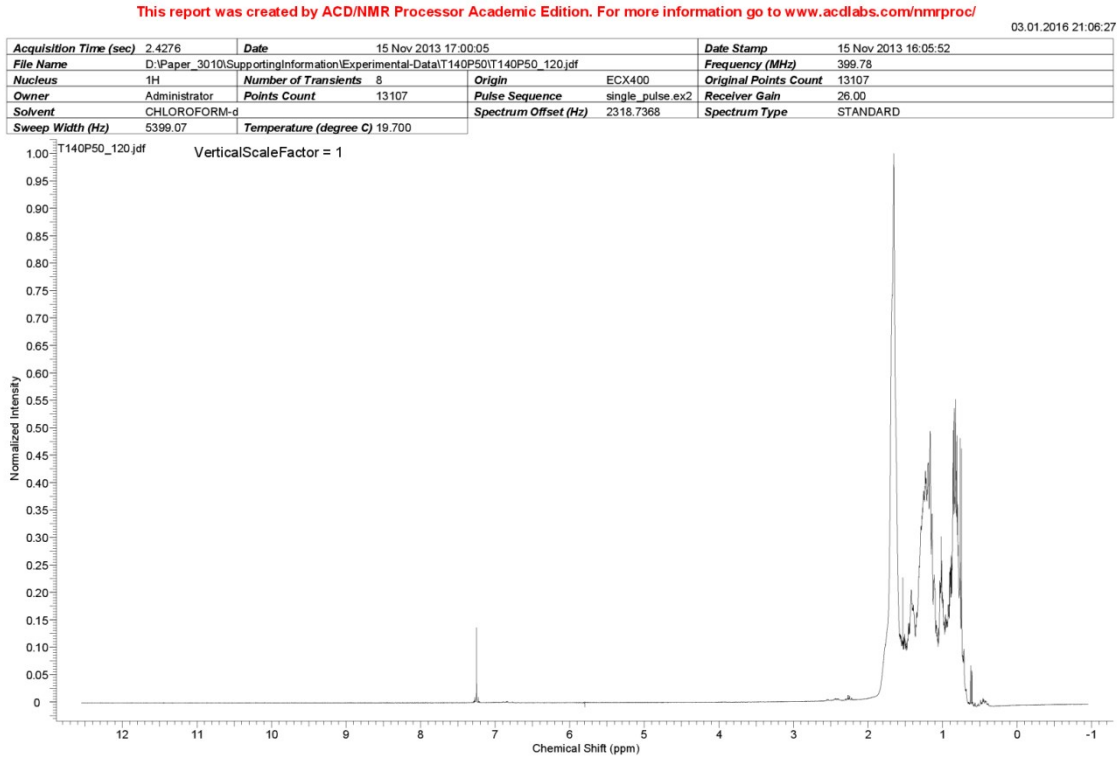

Figure S 38: Hydrogenation of Dibenzyltoluene t_{sample} = 120 min (T=140°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

T = 160 °C ; P = 50 bar

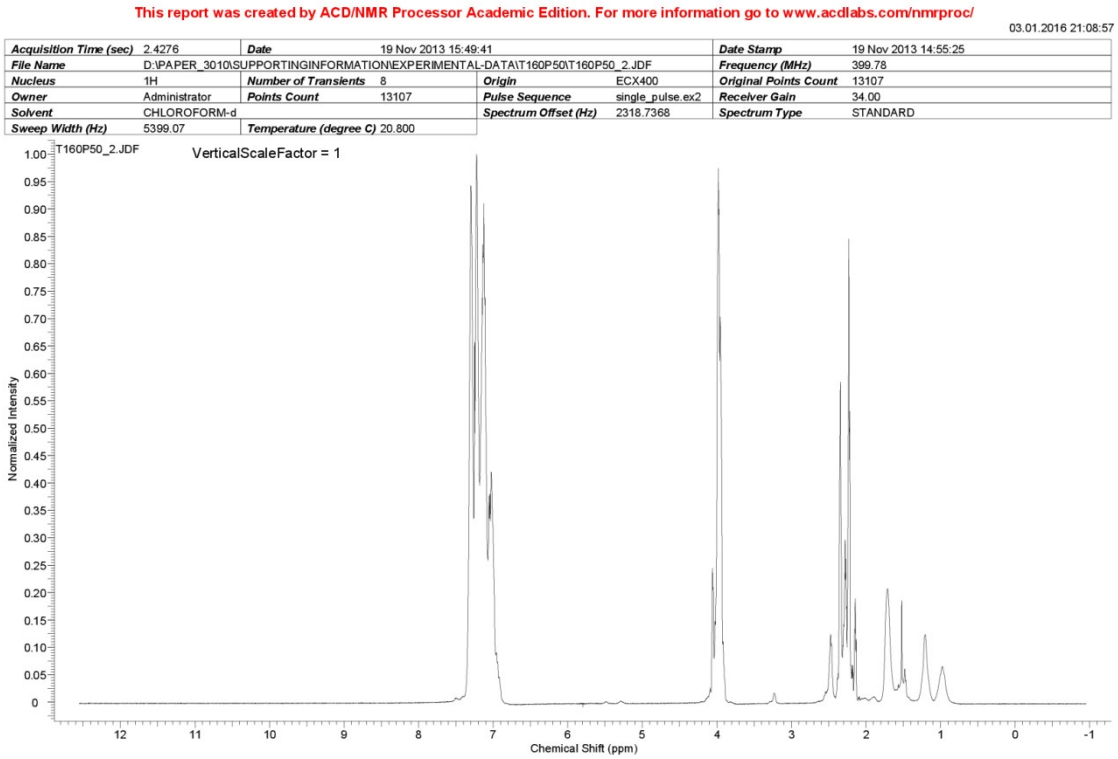

Figure S 39: Hydrogenation of Dibenzyltoluene t_{sample} = 2 min (T=160°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

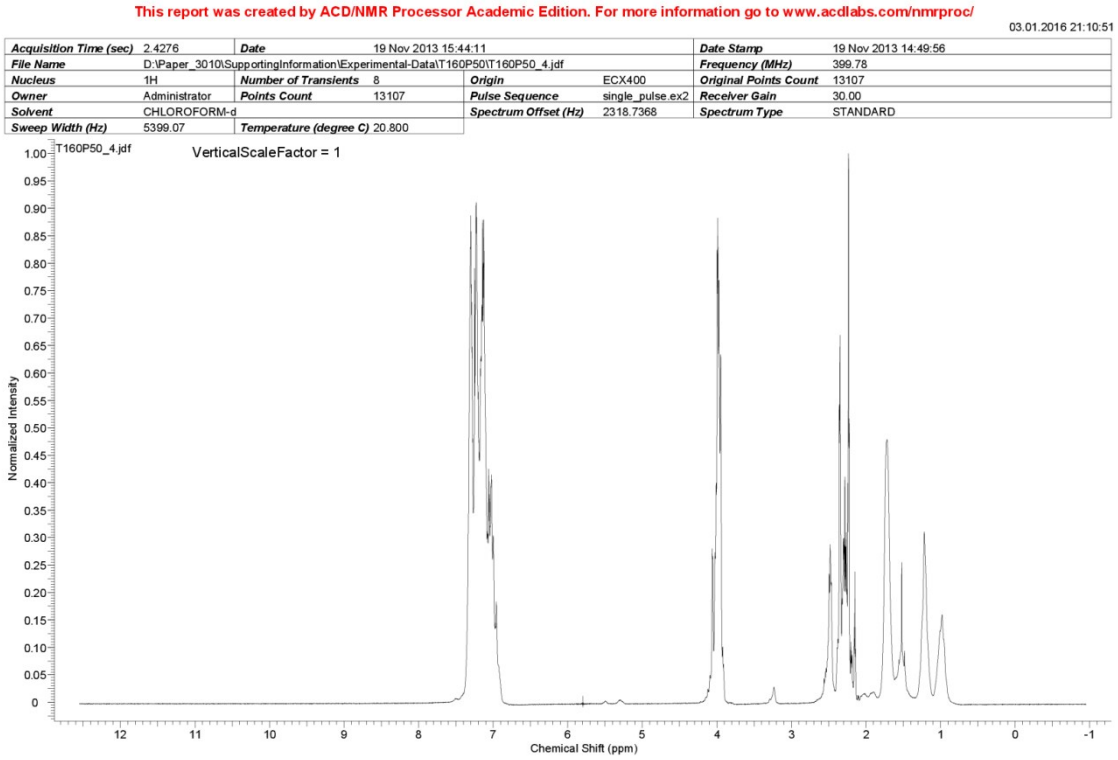

Figure S 40: Hydrogenation of Dibenzyltoluene t_{sample} = 4 min (T=160°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

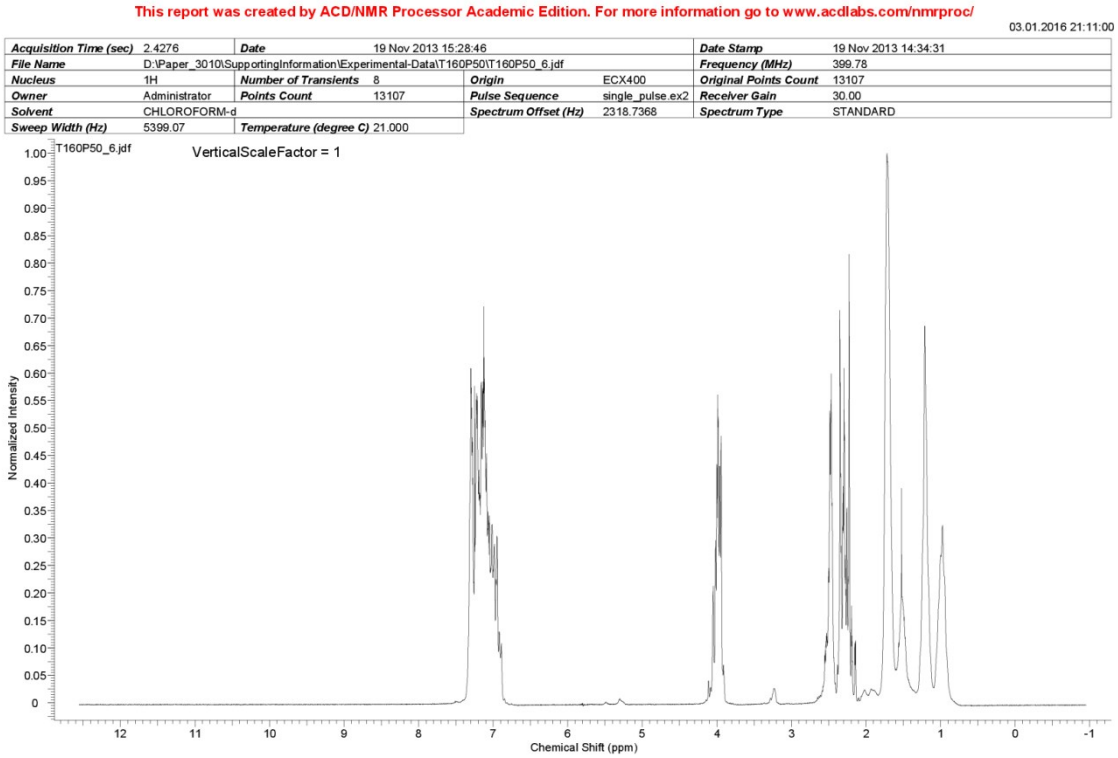

Figure S 41: Hydrogenation of Dibenzyltoluene t_{sample} = 6 min (T=160°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

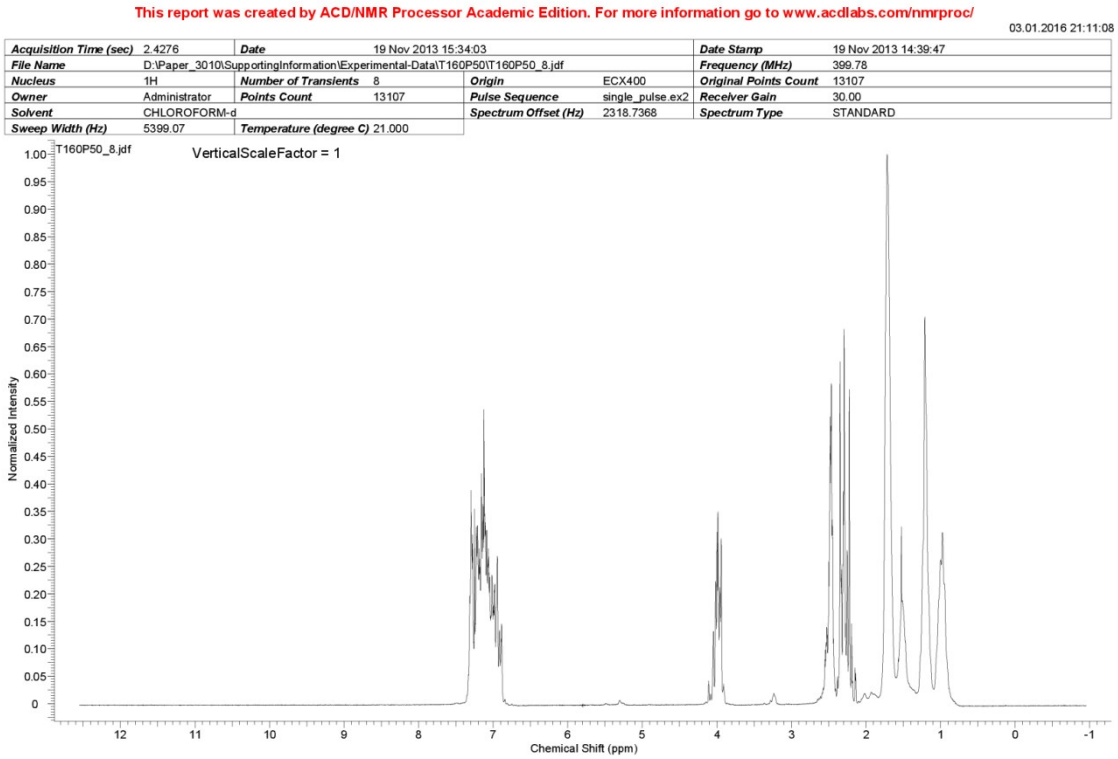

Figure S 42: Hydrogenation of Dibenzyltoluene t_{sample} = 8 min (T=160°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

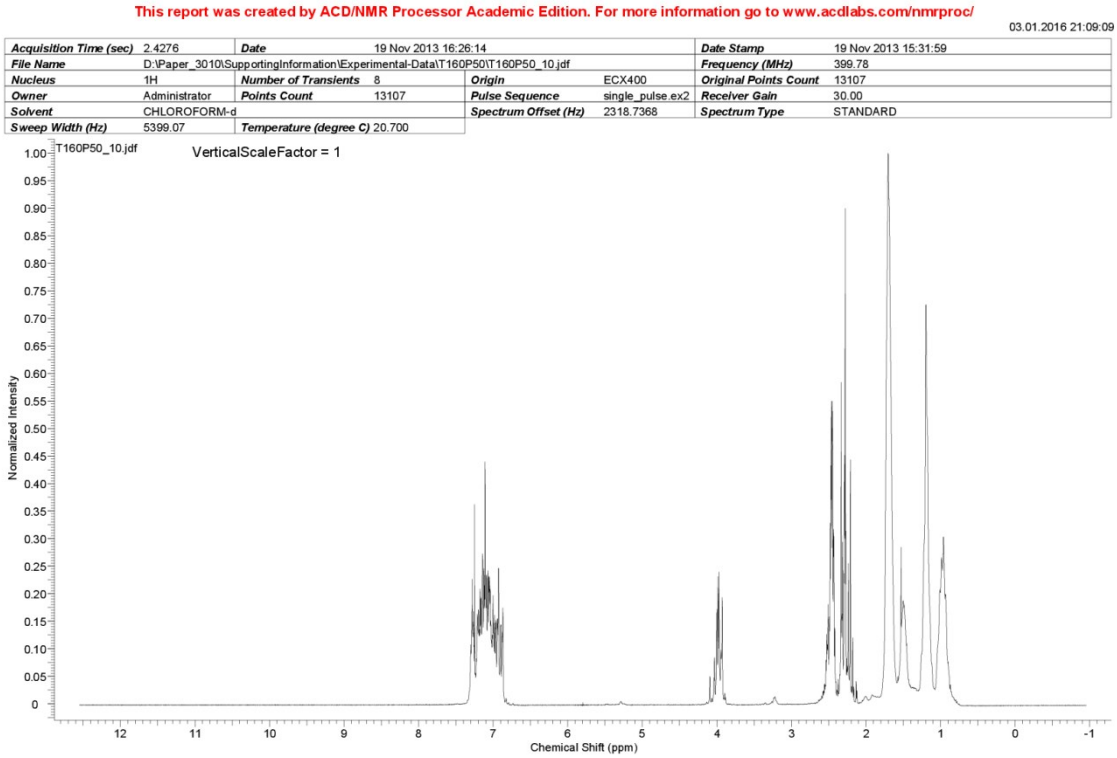

Figure S 43: Hydrogenation of Dibenzyltoluene t_{sample} = 10 min (T=160°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

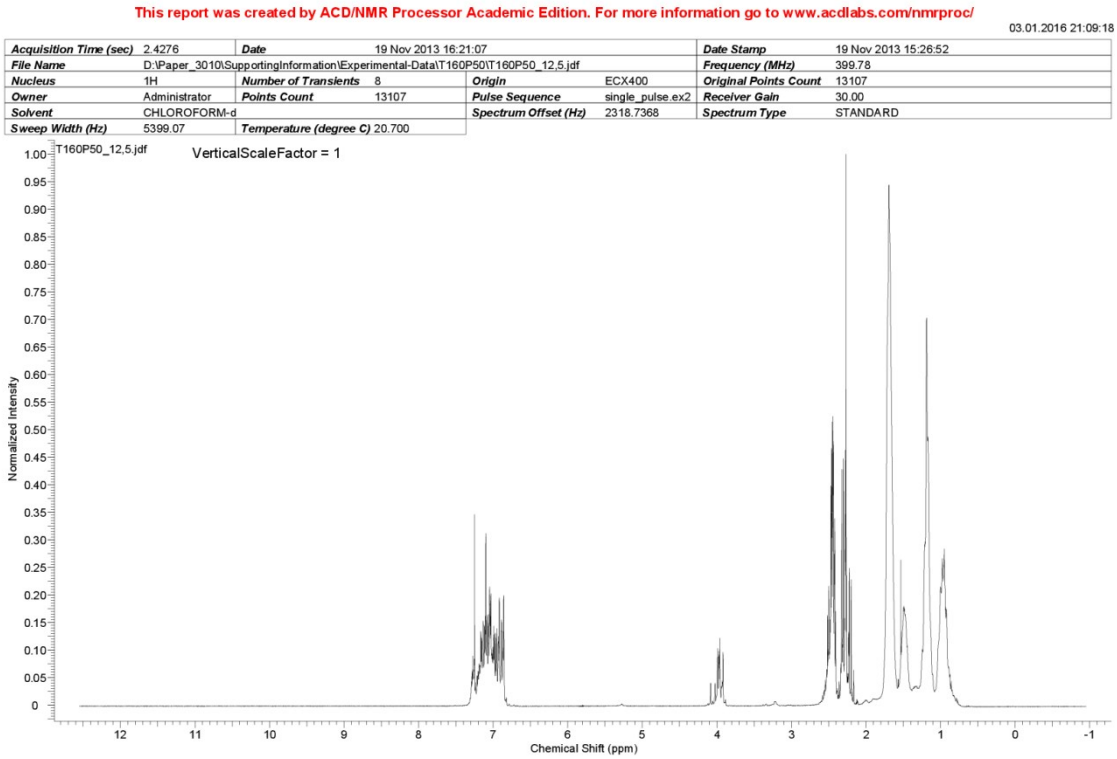

Figure S 44: Hydrogenation of Dibenzyltoluene t_{sample} = 12.5 min (T=160°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

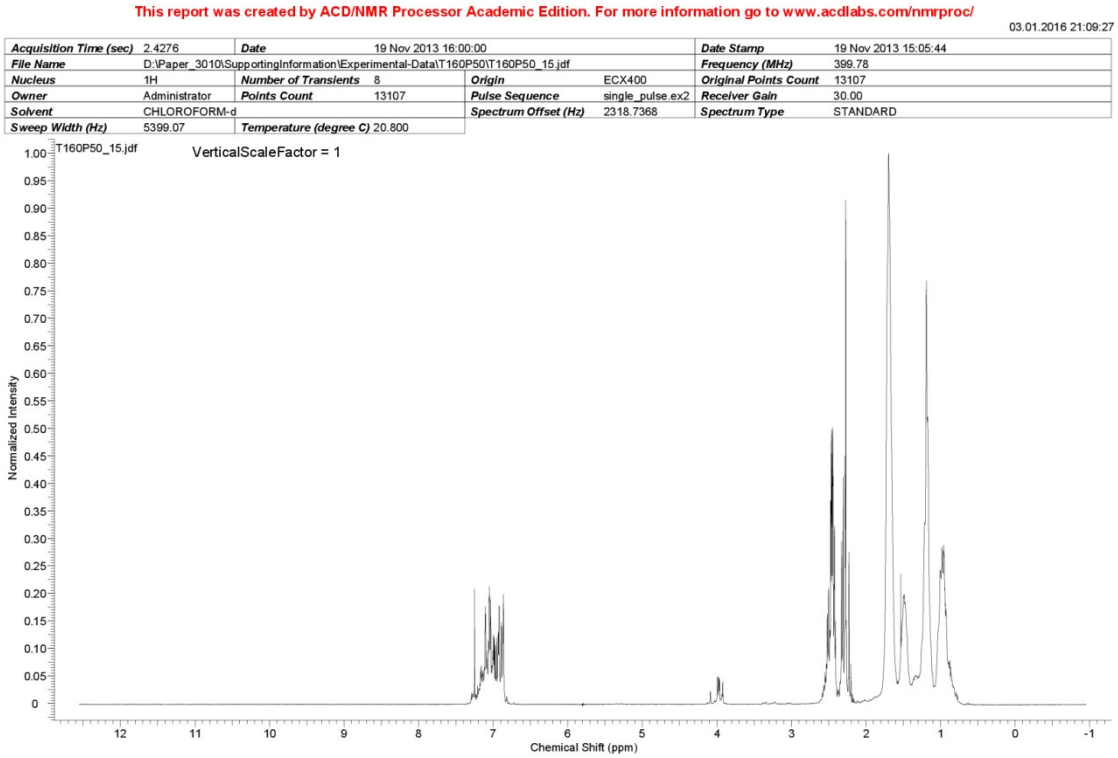

Figure S 45: Hydrogenation of Dibenzyltoluene t_{sample} = 15 min (T=160°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

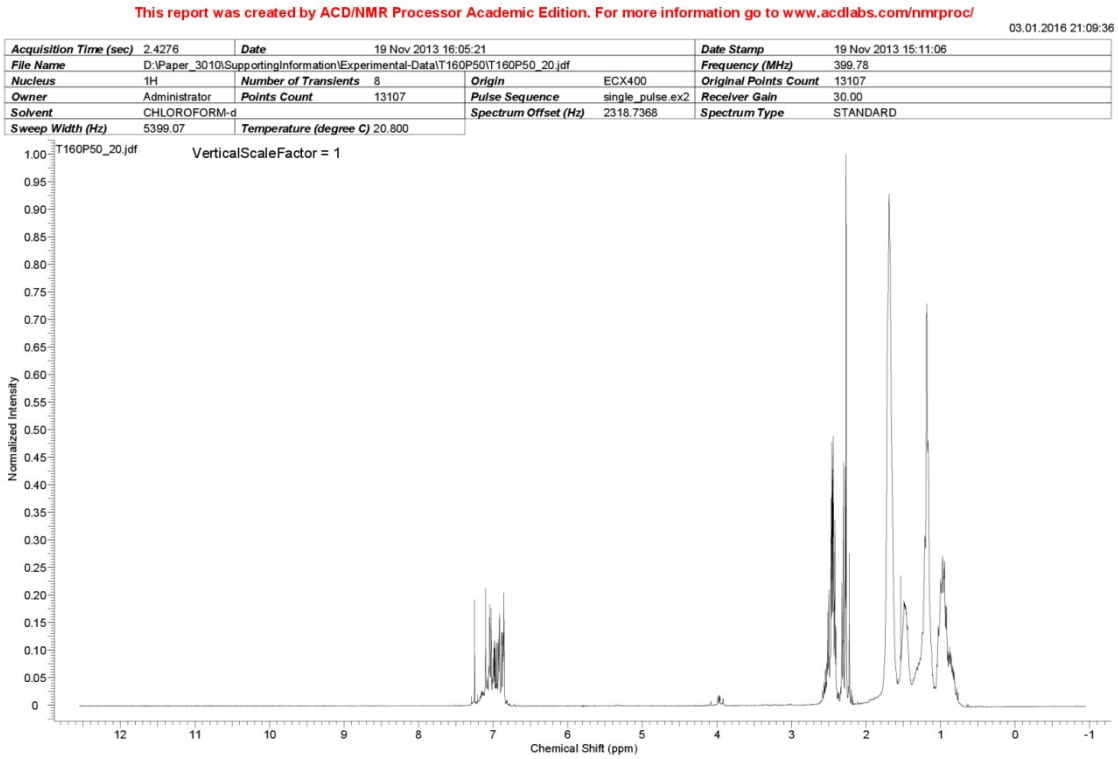

Figure S 46: Hydrogenation of Dibenzyltoluene t_{sample} = 20 min (T=160°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

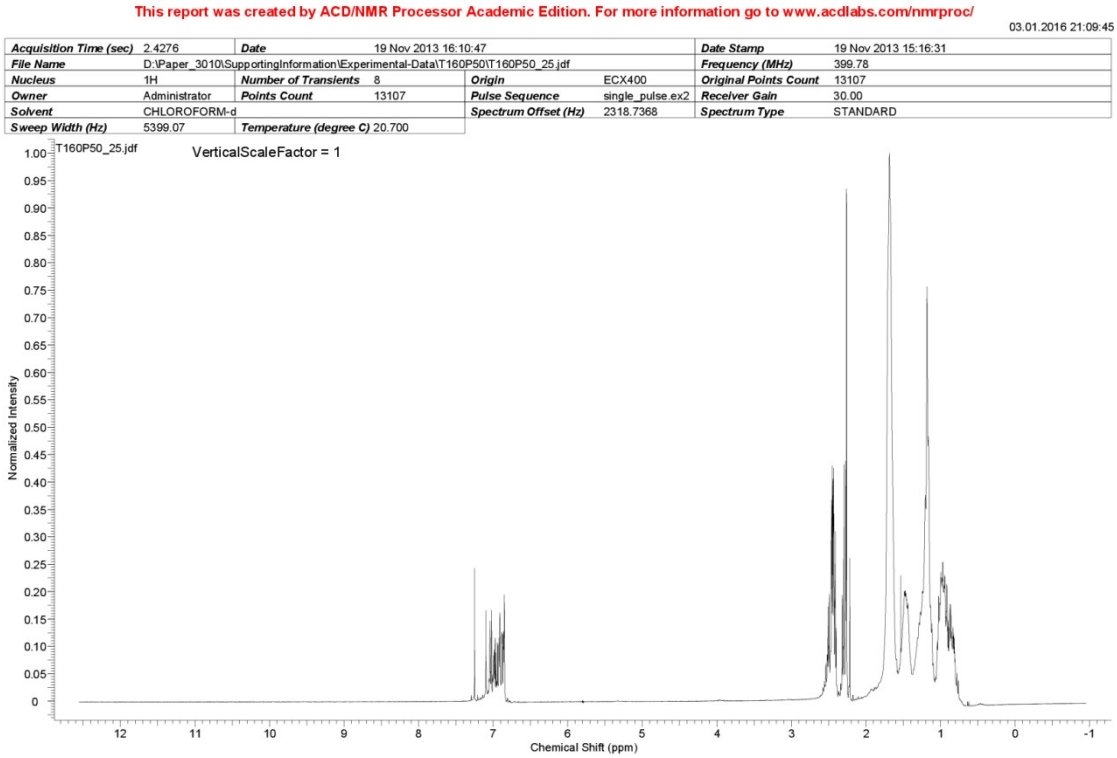

Figure S 47: Hydrogenation of Dibenzyltoluene t_{sample} = 25 min (T=160°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

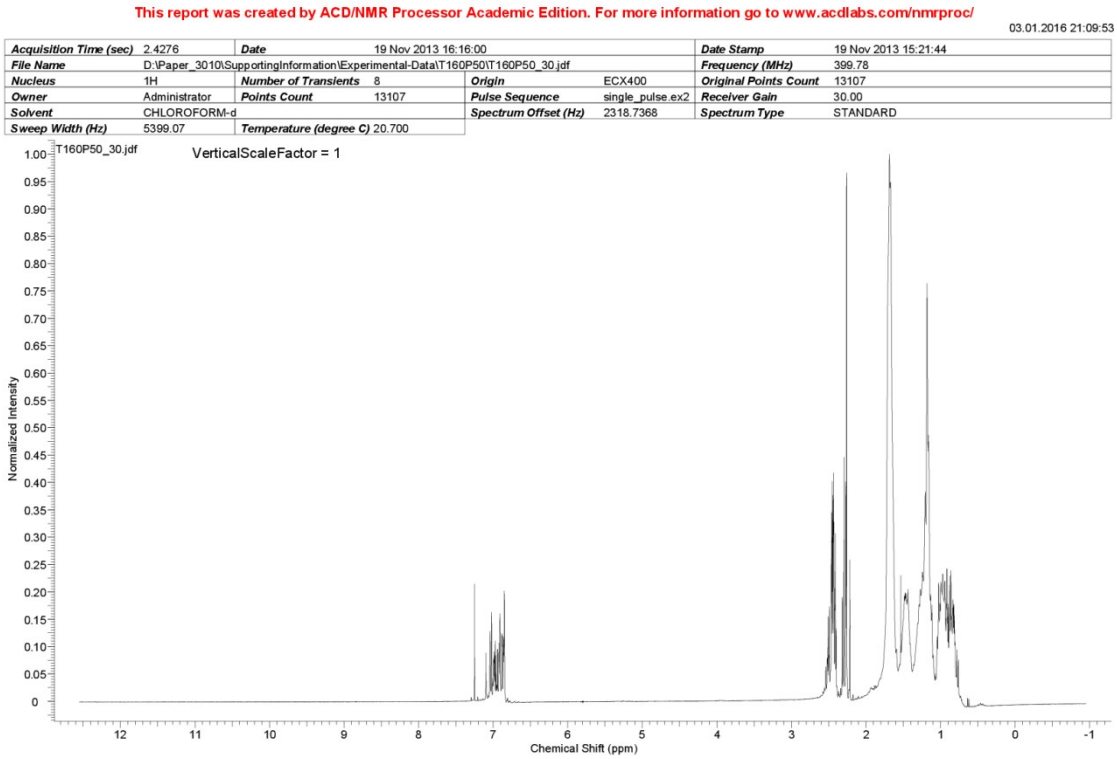

Figure S 48: Hydrogenation of Dibenzyltoluene t_{sample} = 30 min (T=160°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

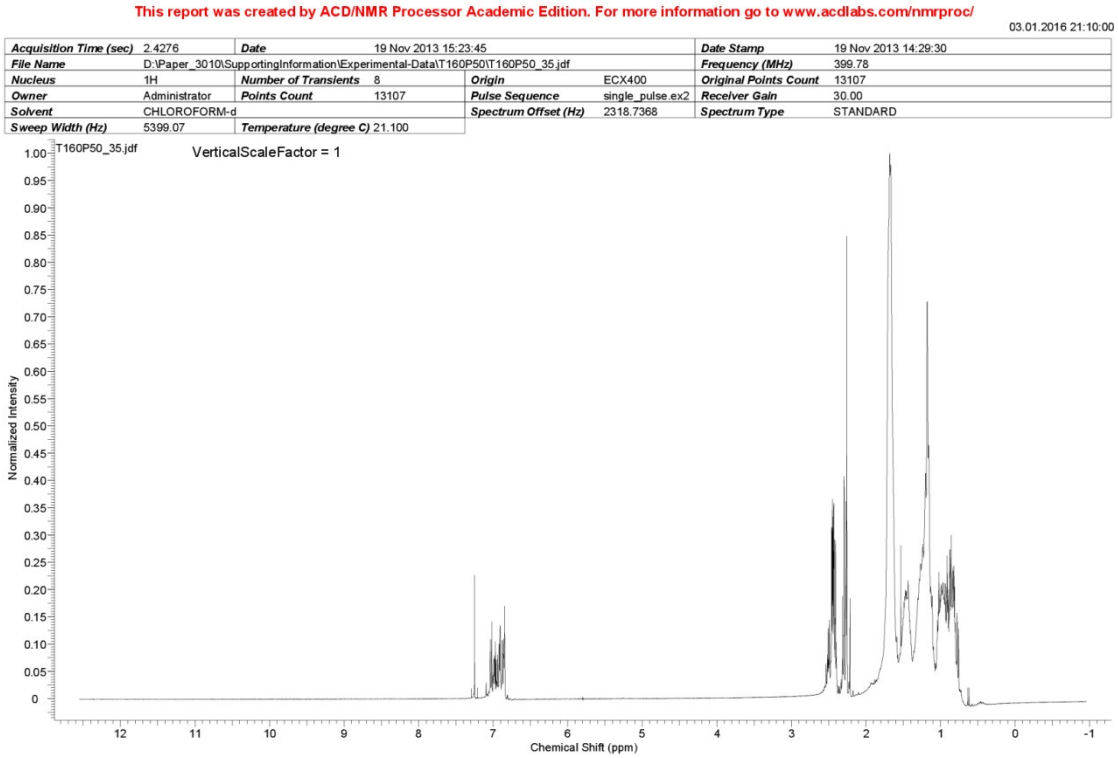

Figure S 49: Hydrogenation of Dibenzyltoluene t_{sample} = 35 min (T=160°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

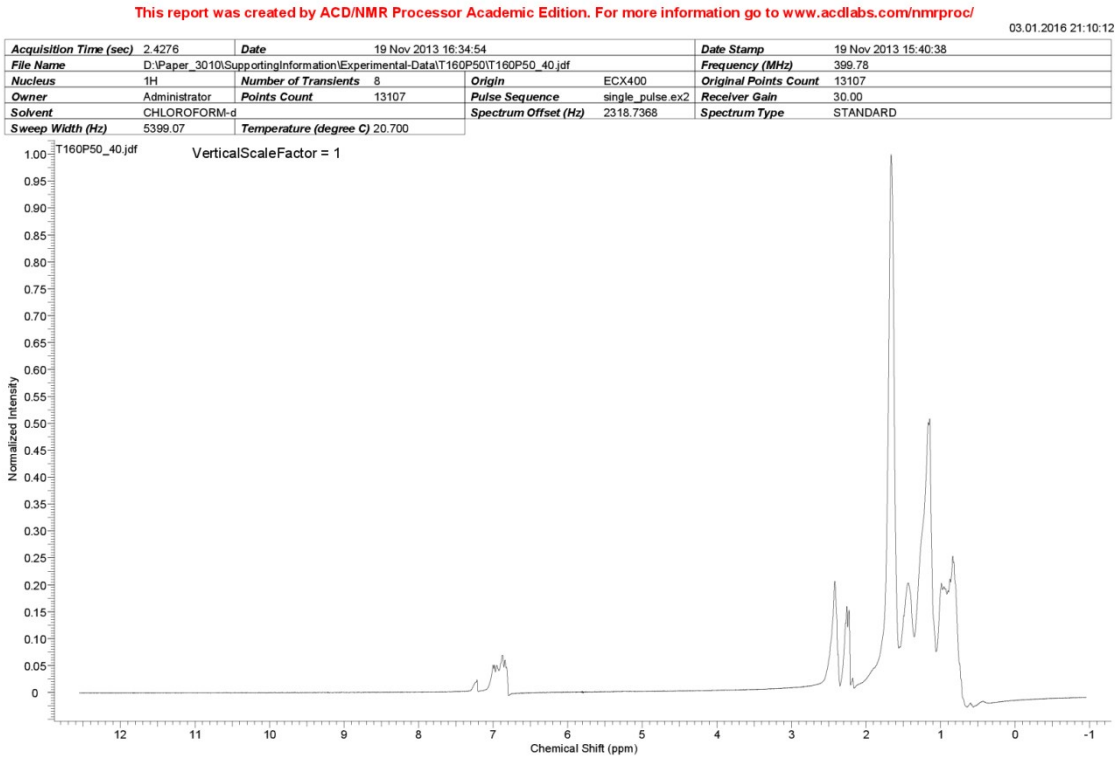

Figure S 50: Hydrogenation of Dibenzyltoluene t_{sample} = 40 min (T=160°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

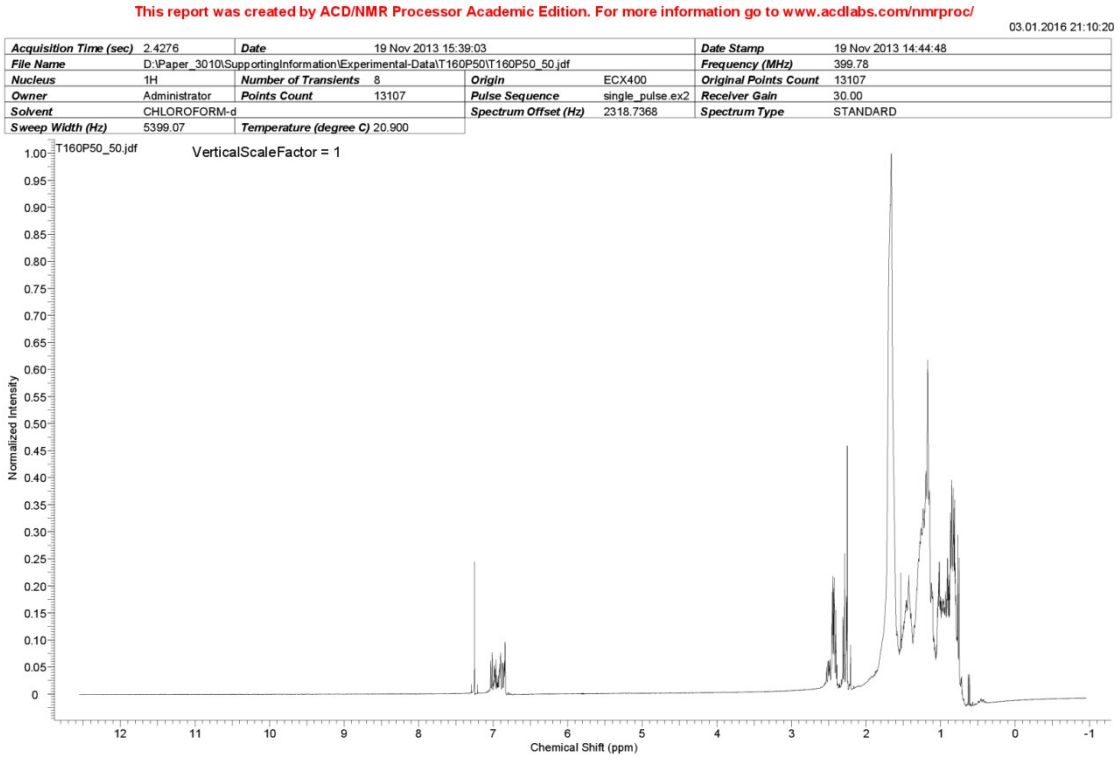

Figure S 51: Hydrogenation of Dibenzyltoluene t_{sample} = 50 min (T=160°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

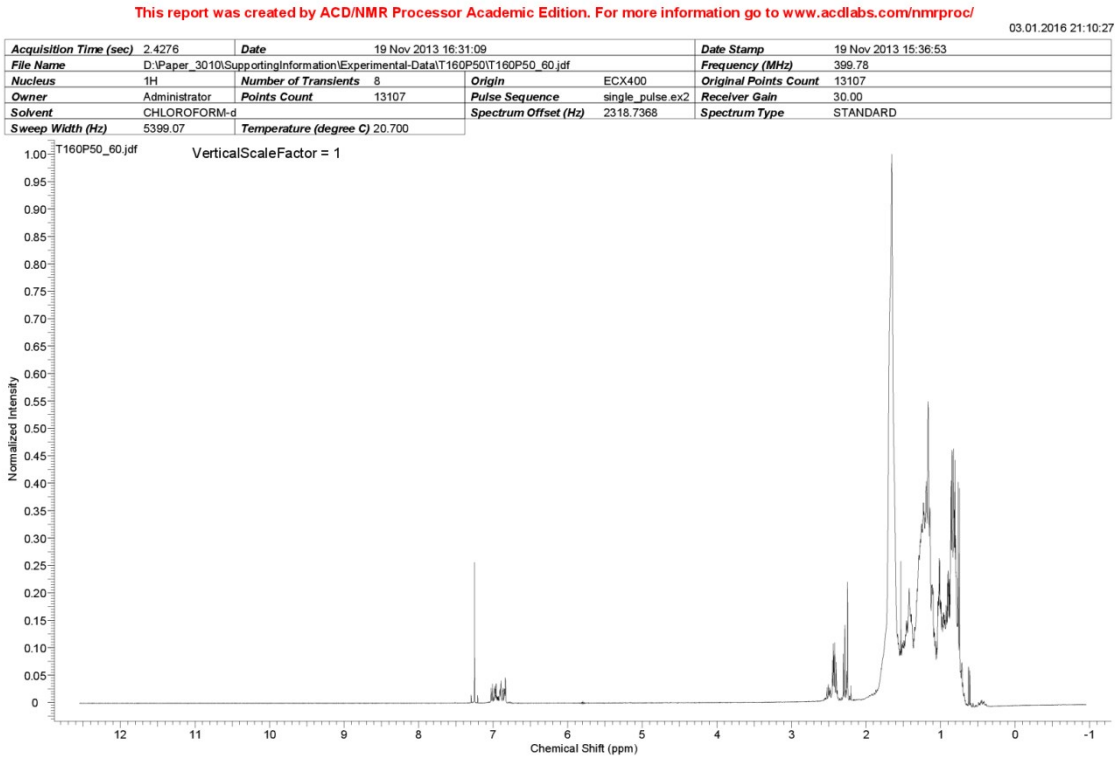

Figure S 52: Hydrogenation of Dibenzyltoluene t_{sample} = 60 min (T=160°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

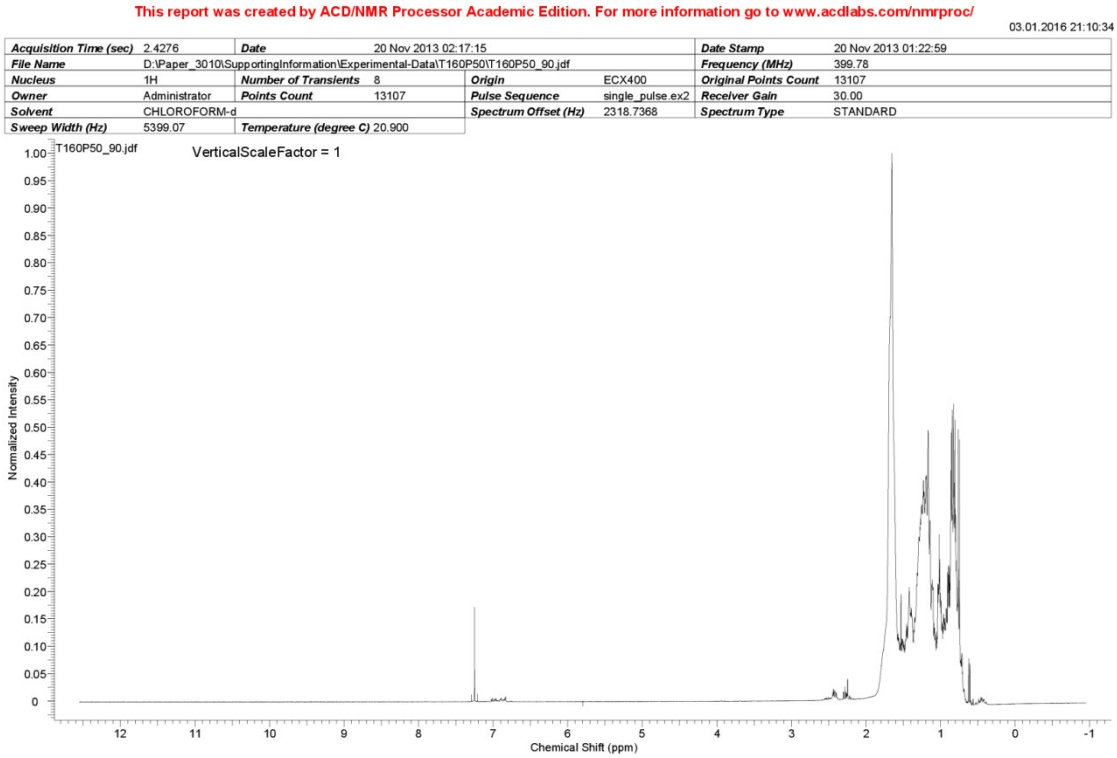

Figure S 53: Hydrogenation of Dibenzyltoluene t_{sample} = 90 min (T=160°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

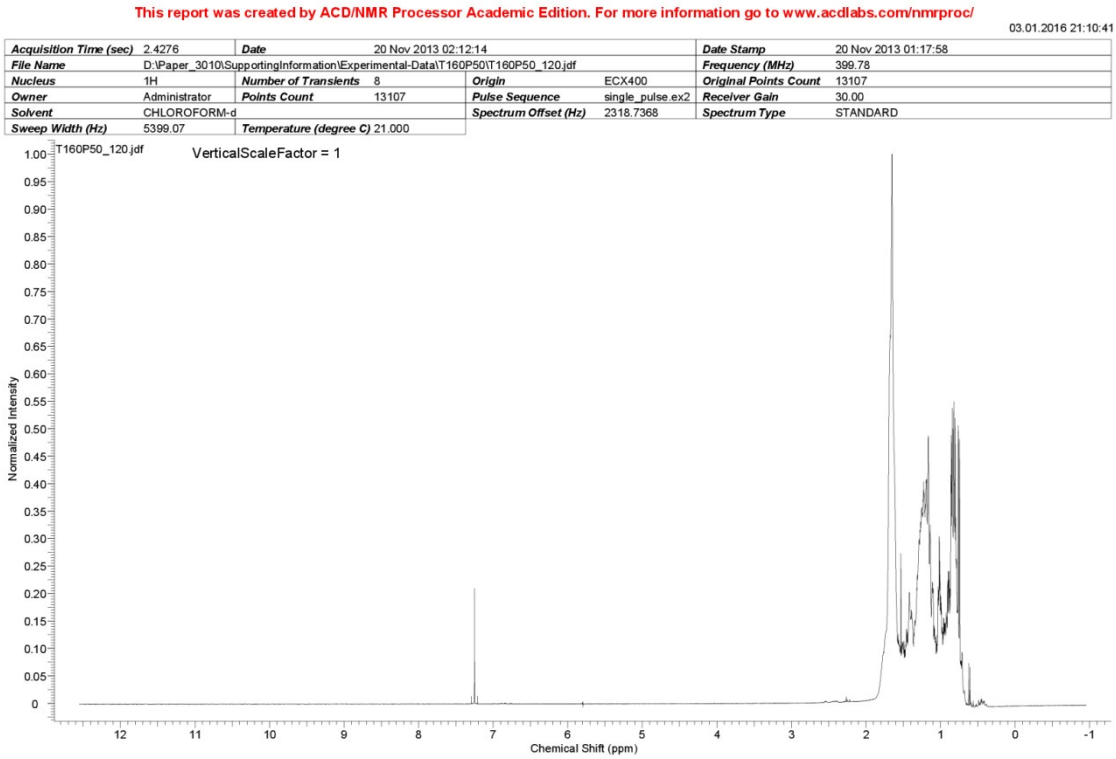

Figure S 54: Hydrogenation of Dibenzyltoluene t_{sample} = 120 min (T=160°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

T = 180 °C ; P = 50 bar

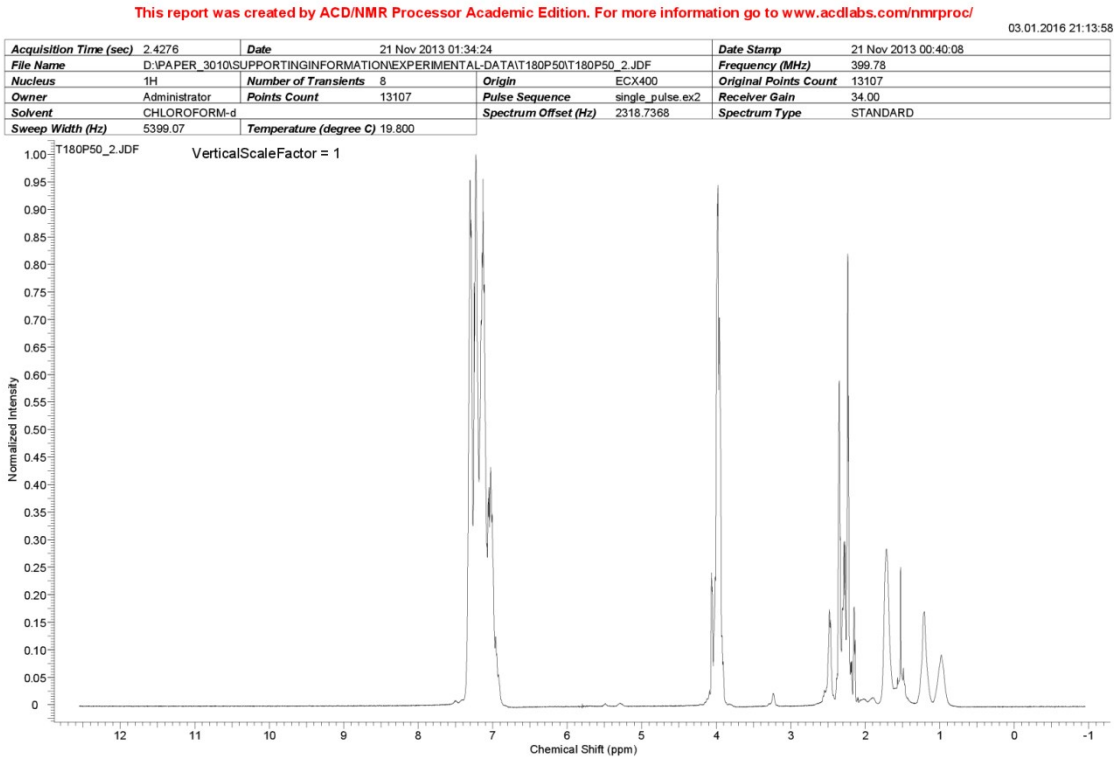

Figure S 55: Hydrogenation of Dibenzyltoluene t_{sample} = 2 min (T=180°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

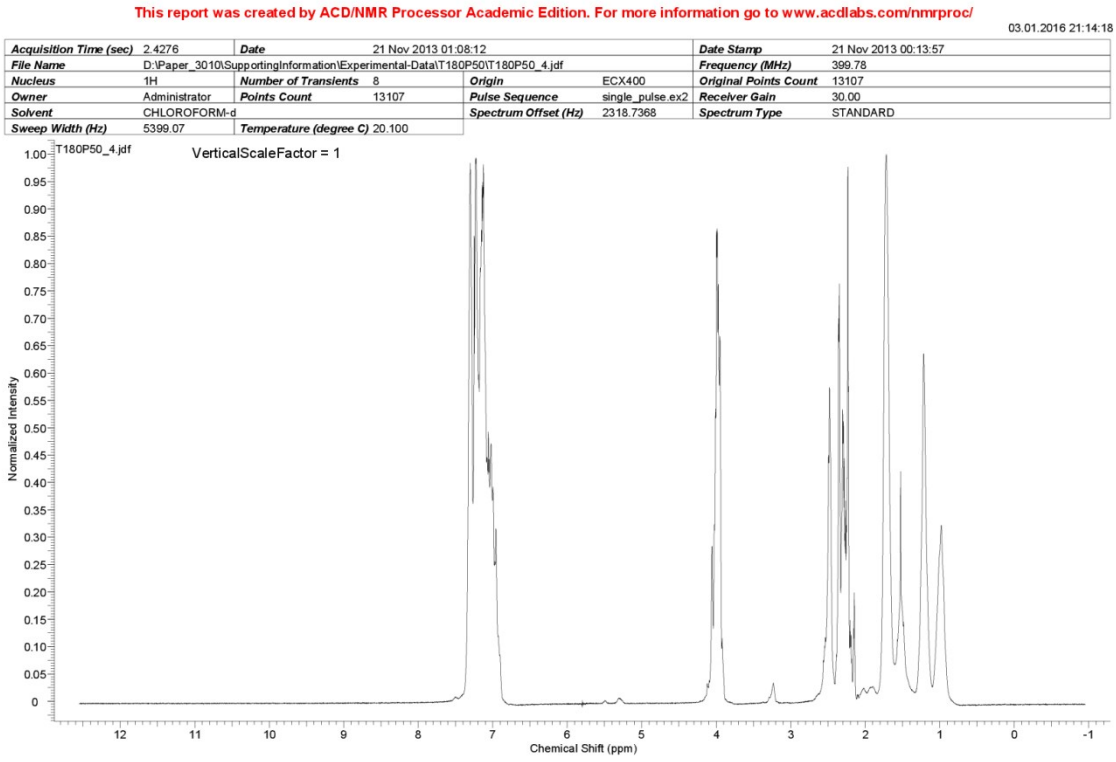

Figure S 56: Hydrogenation of Dibenzyltoluene t_{sample} = 4 min (T=180°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

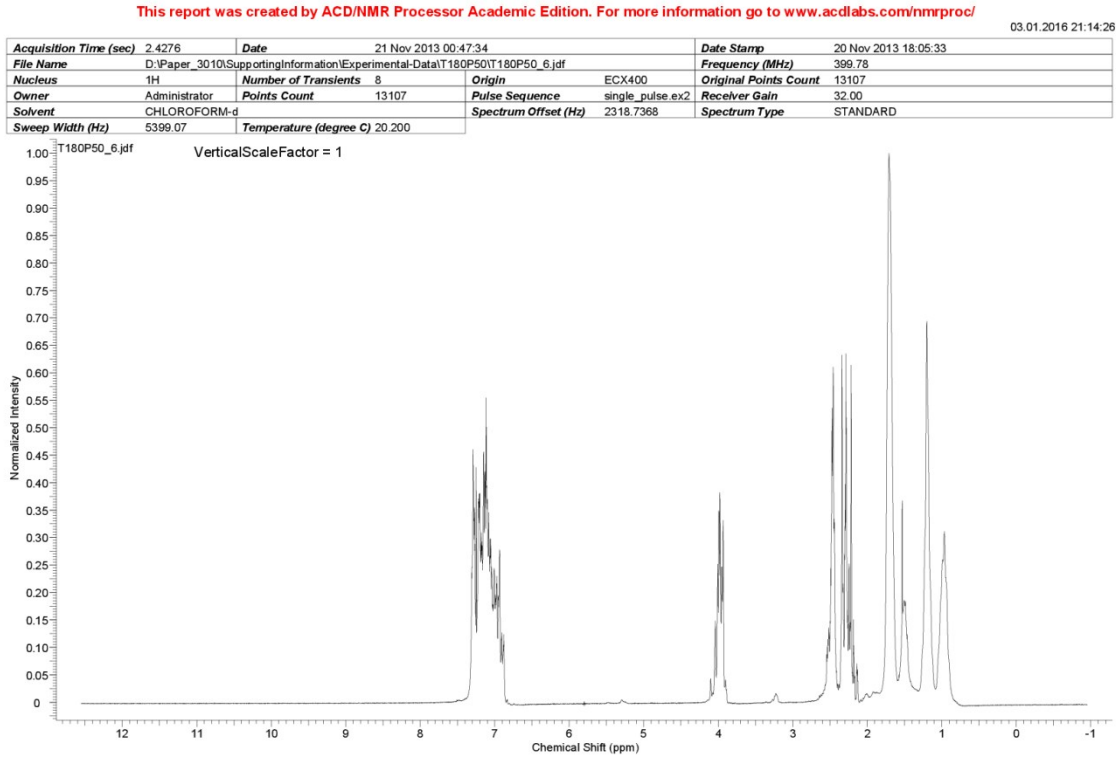

Figure S 57: Hydrogenation of Dibenzyltoluene t_{sample} = 6 min (T=180°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

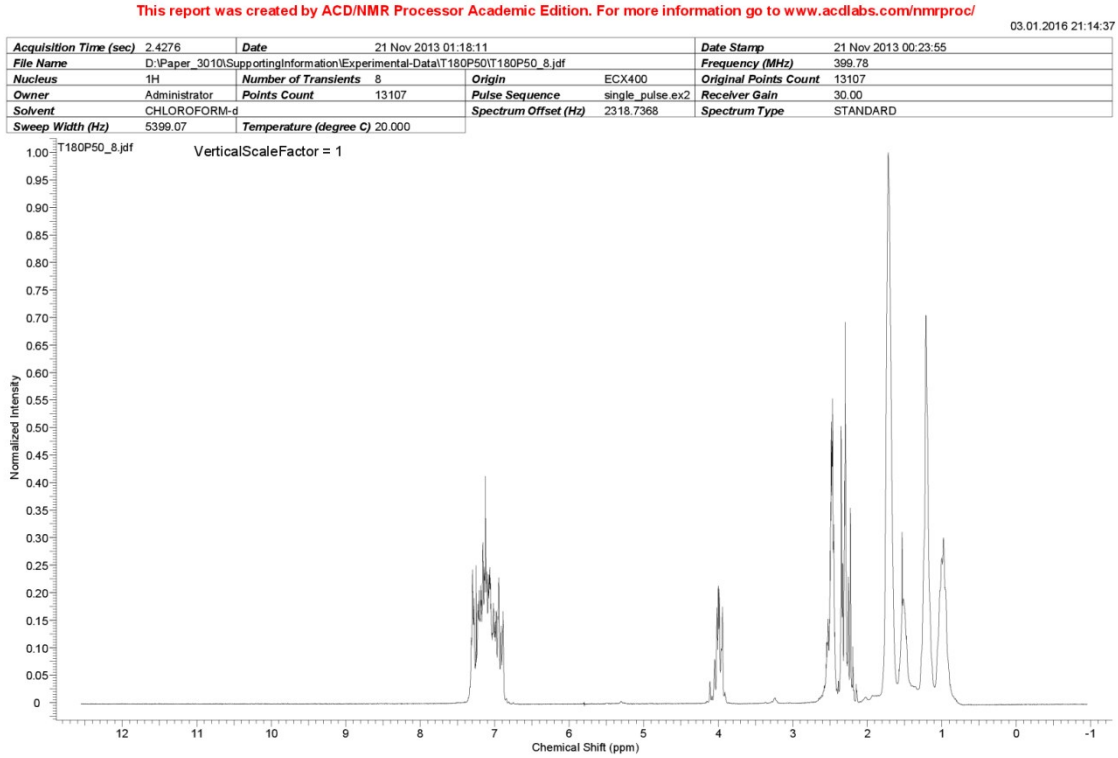

Figure S 58: Hydrogenation of Dibenzyltoluene t_{sample} = 8 min (T=180°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

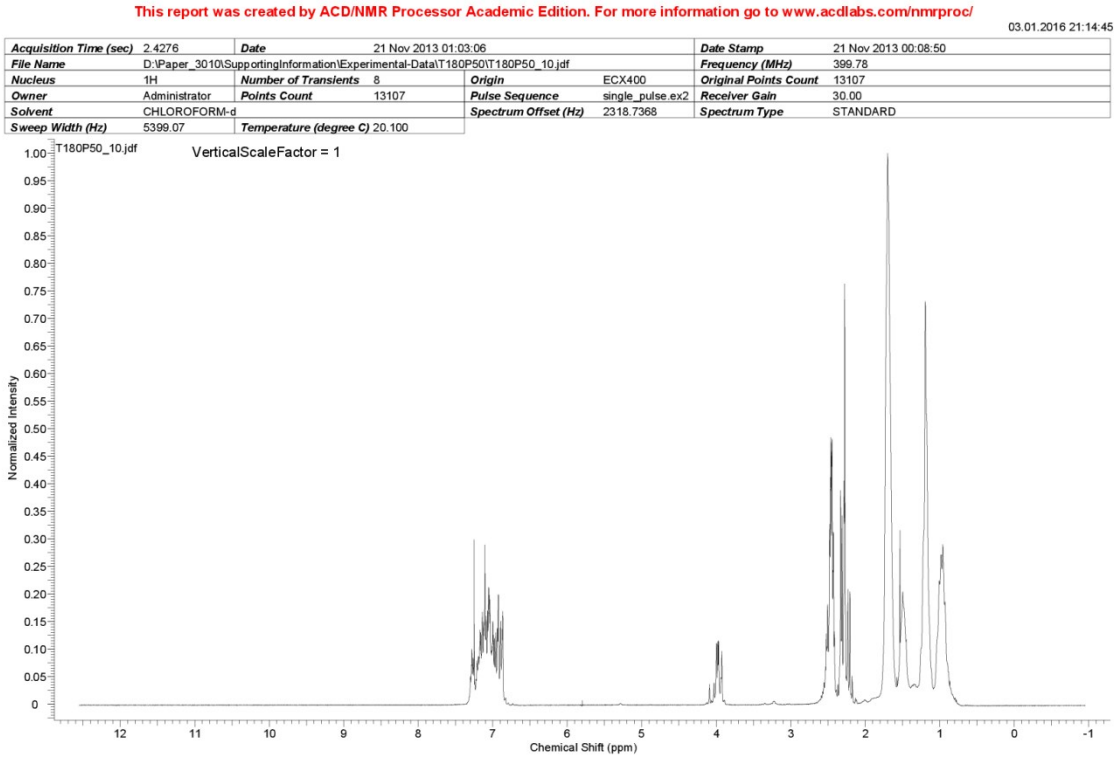

Figure S 59: Hydrogenation of Dibenzyltoluene t_{sample} = 10 min (T=180°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

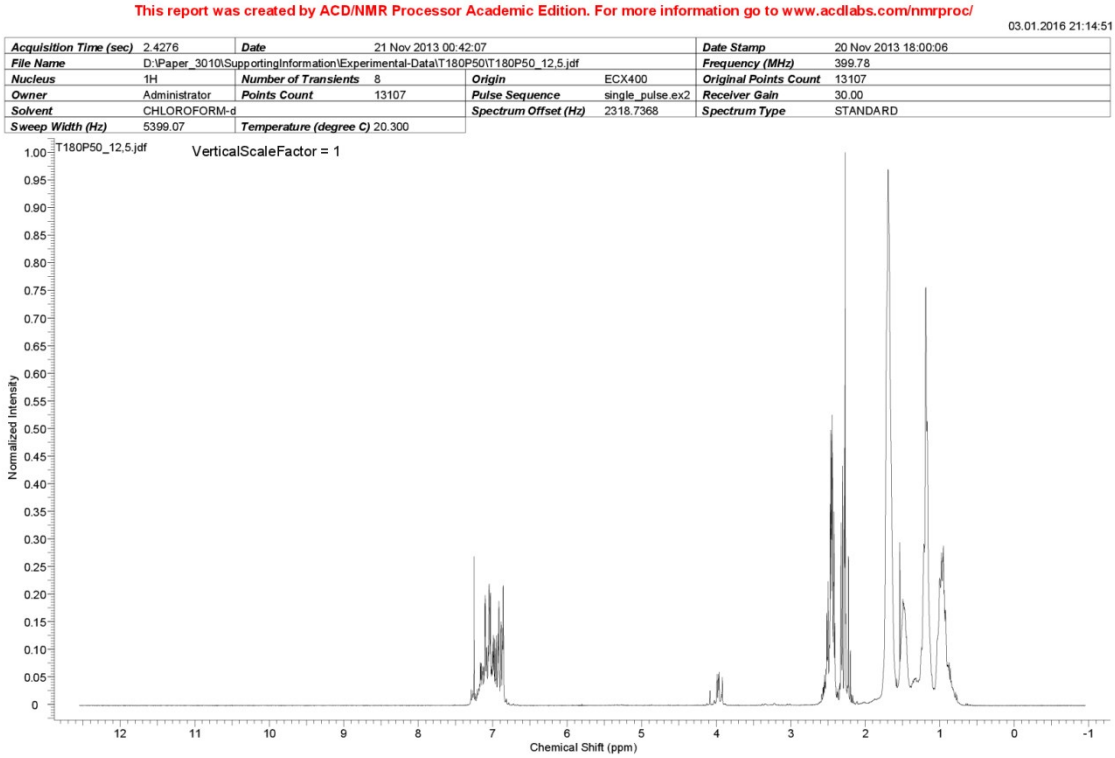

Figure S 60: Hydrogenation of Dibenzyltoluene t_{sample} = 12.5 min (T=180°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

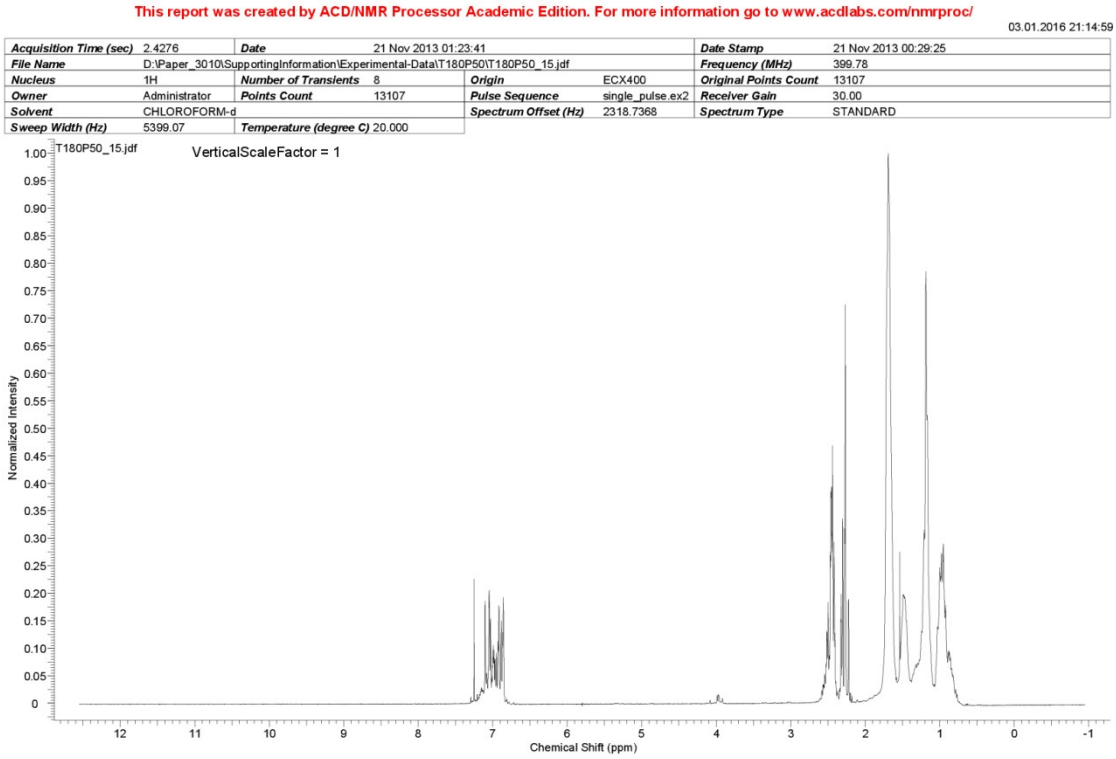

Figure S 61: Hydrogenation of Dibenzyltoluene t_{sample} = 15 min (T=180°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

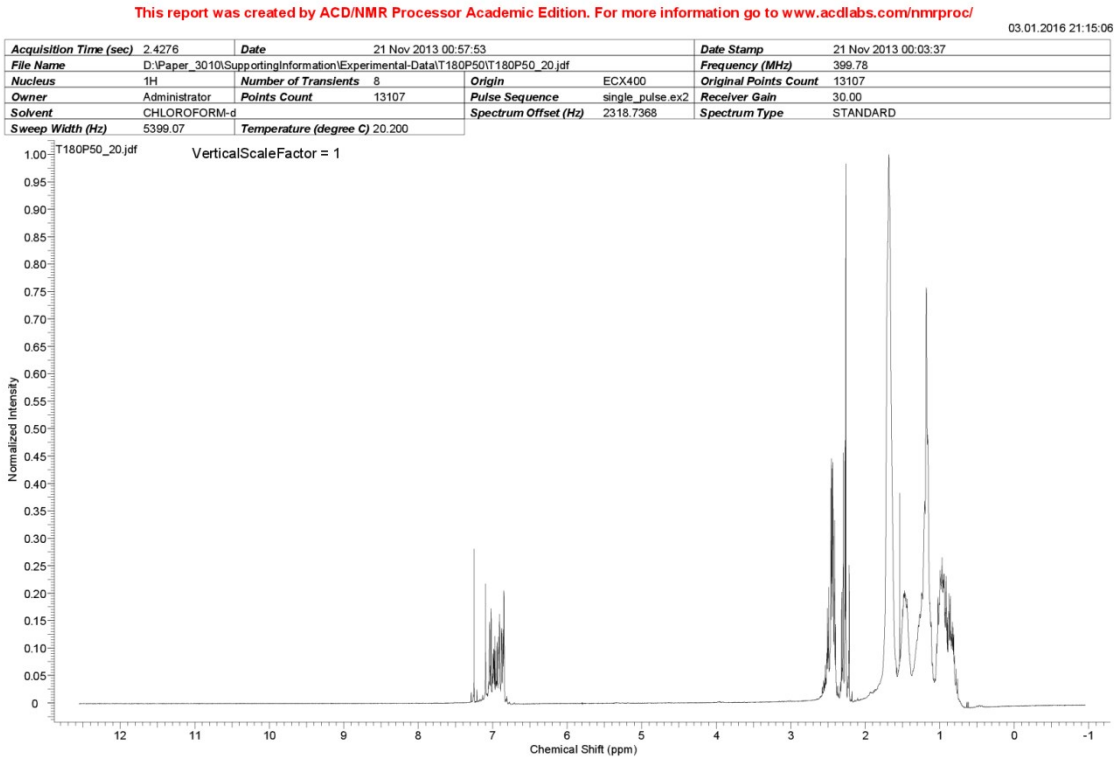

Figure S 62: Hydrogenation of Dibenzyltoluene t_{sample} = 20 min (T=180°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

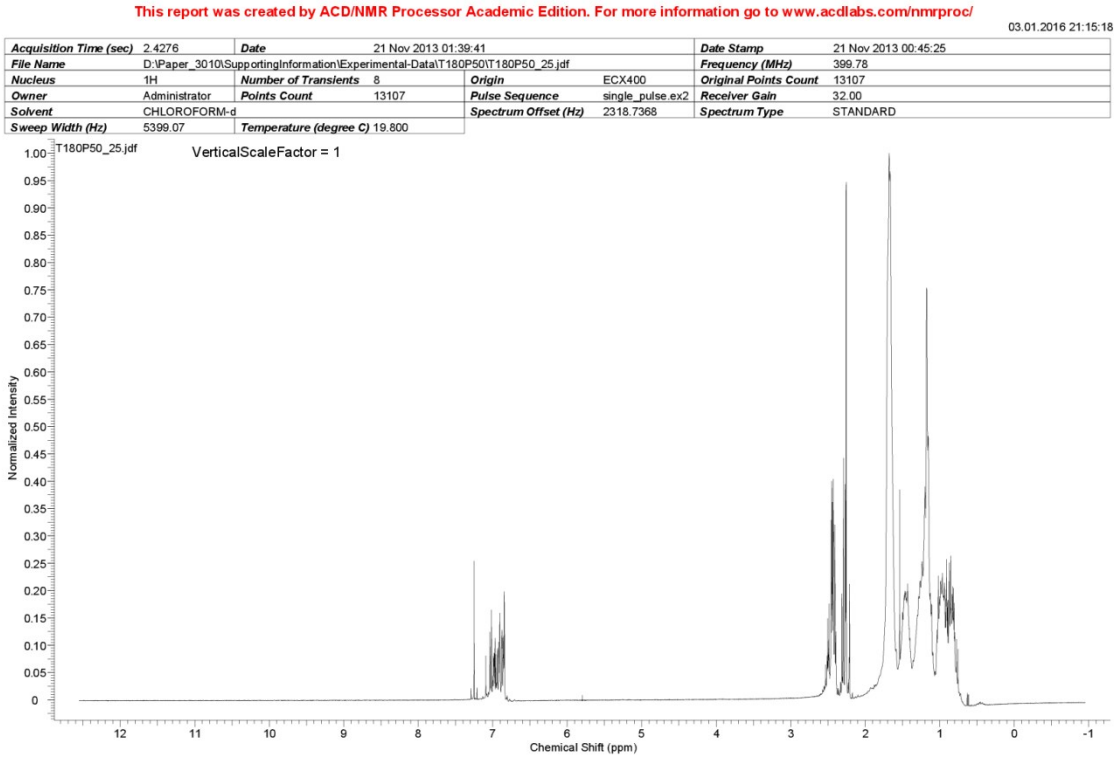

Figure S 63: Hydrogenation of Dibenzyltoluene t_{sample} = 25 min (T=180°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

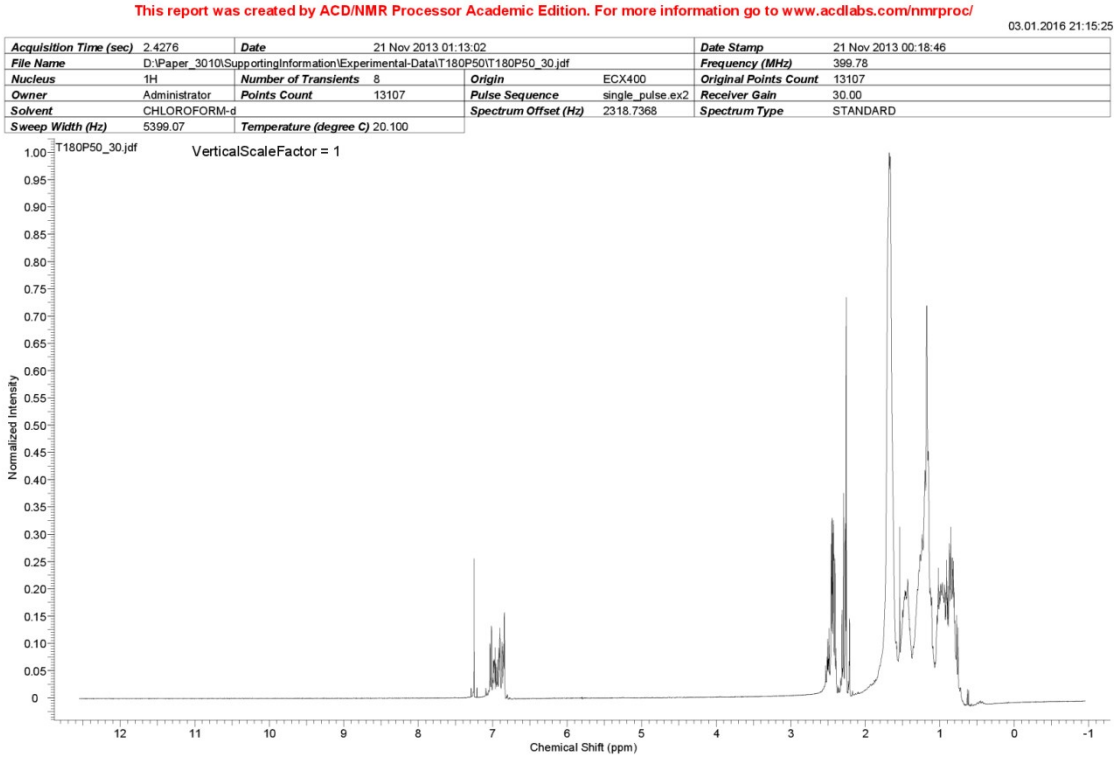

Figure S 64: Hydrogenation of Dibenzyltoluene t_{sample} = 30 min (T=180°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

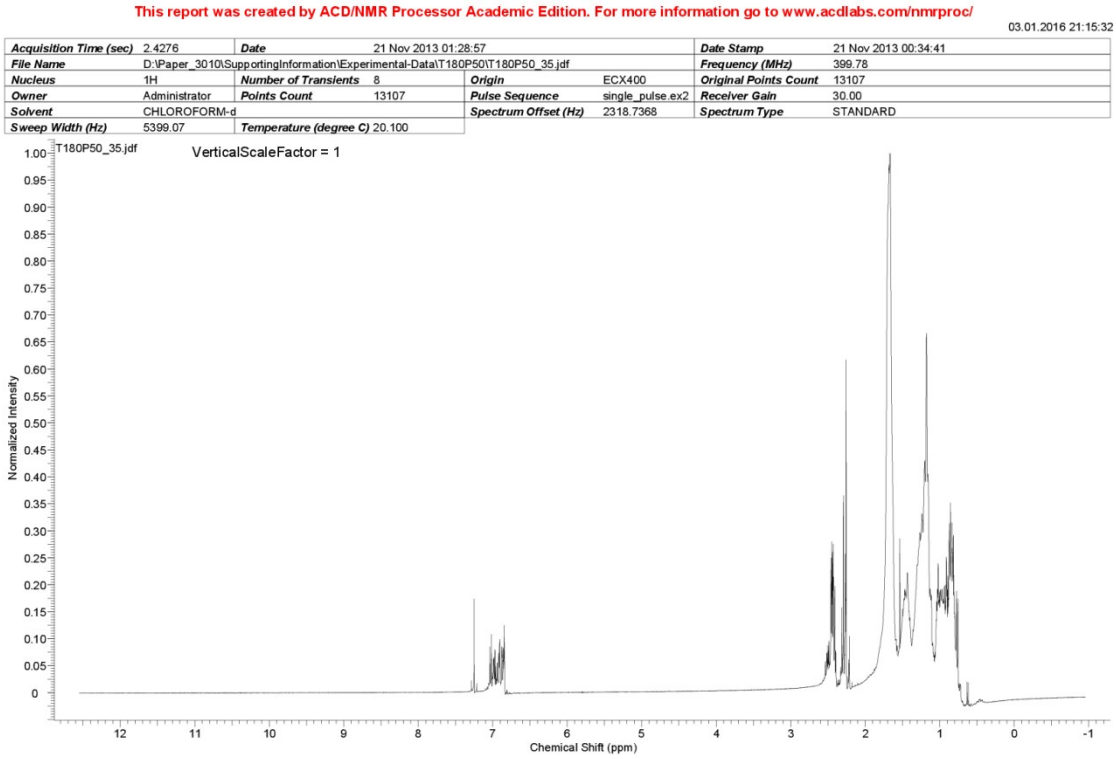

Figure S 65: Hydrogenation of Dibenzyltoluene t_{sample} = 35 min (T=180°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

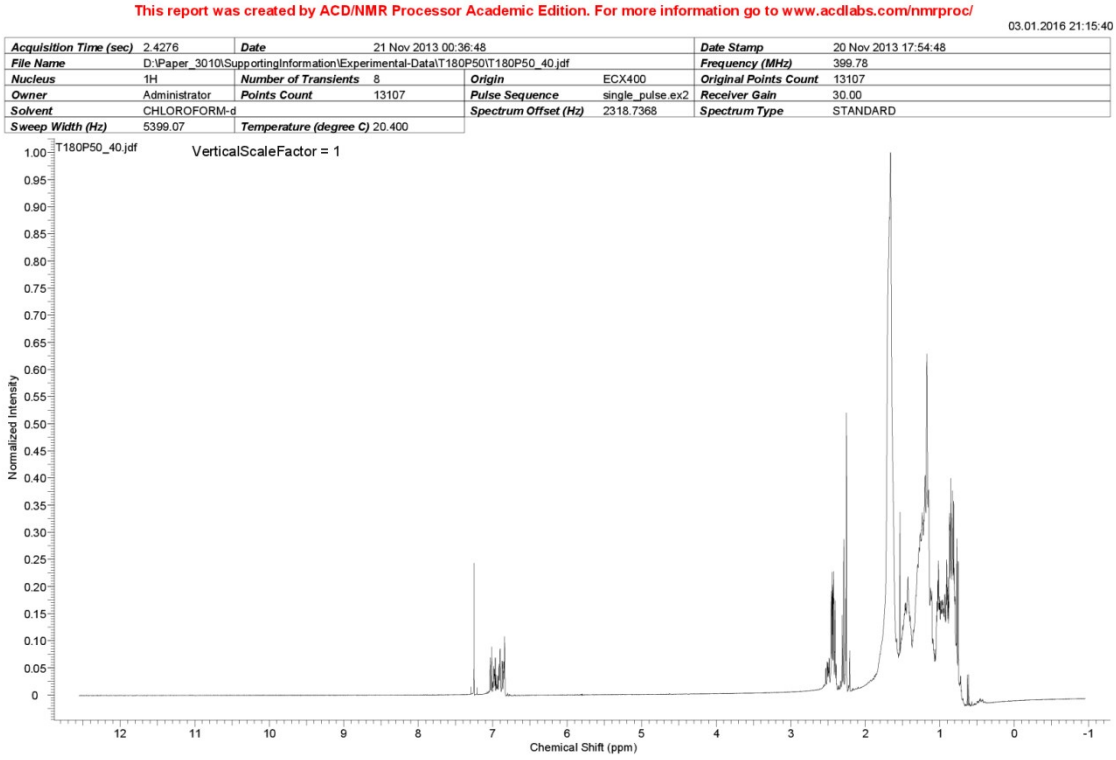

Figure S 66: Hydrogenation of Dibenzyltoluene t_{sample} = 40 min (T=180°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

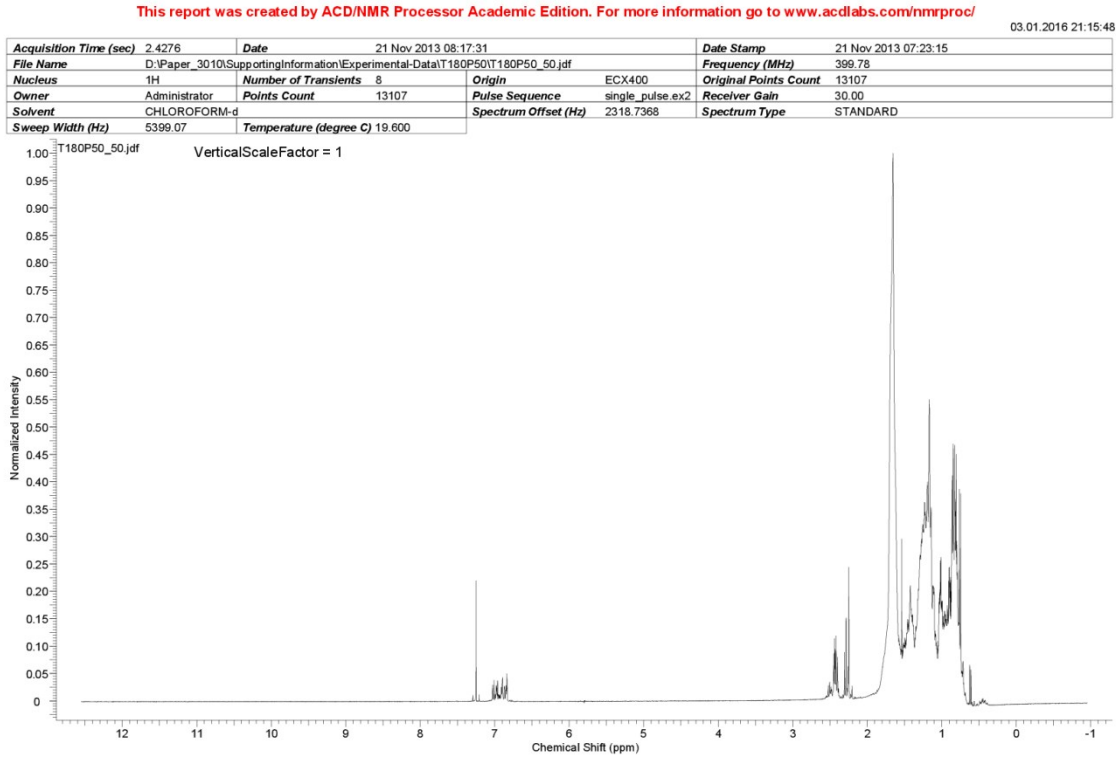

Figure S 67: Hydrogenation of Dibenzyltoluene t_{sample} = 50 min (T=180°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

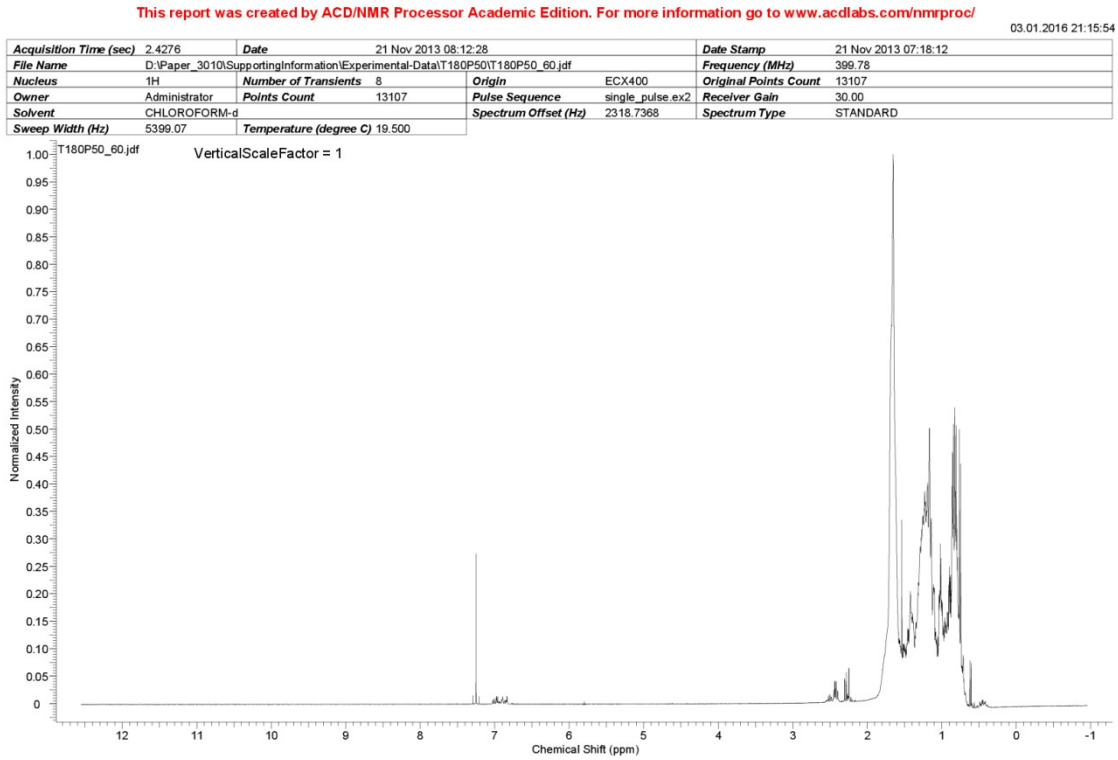

Figure S 68: Hydrogenation of Dibenzyltoluene t_{sample} = 60 min (T=180°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

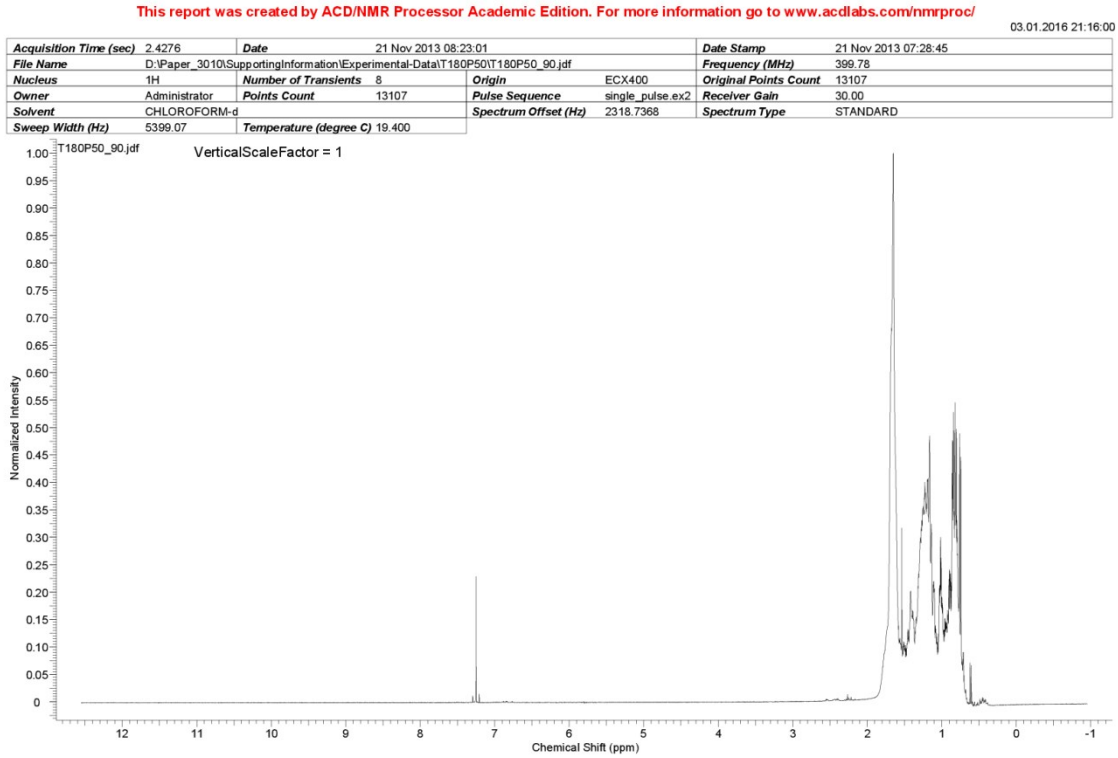

Figure S 69: Hydrogenation of Dibenzyltoluene t_{sample} = 90 min (T=180°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

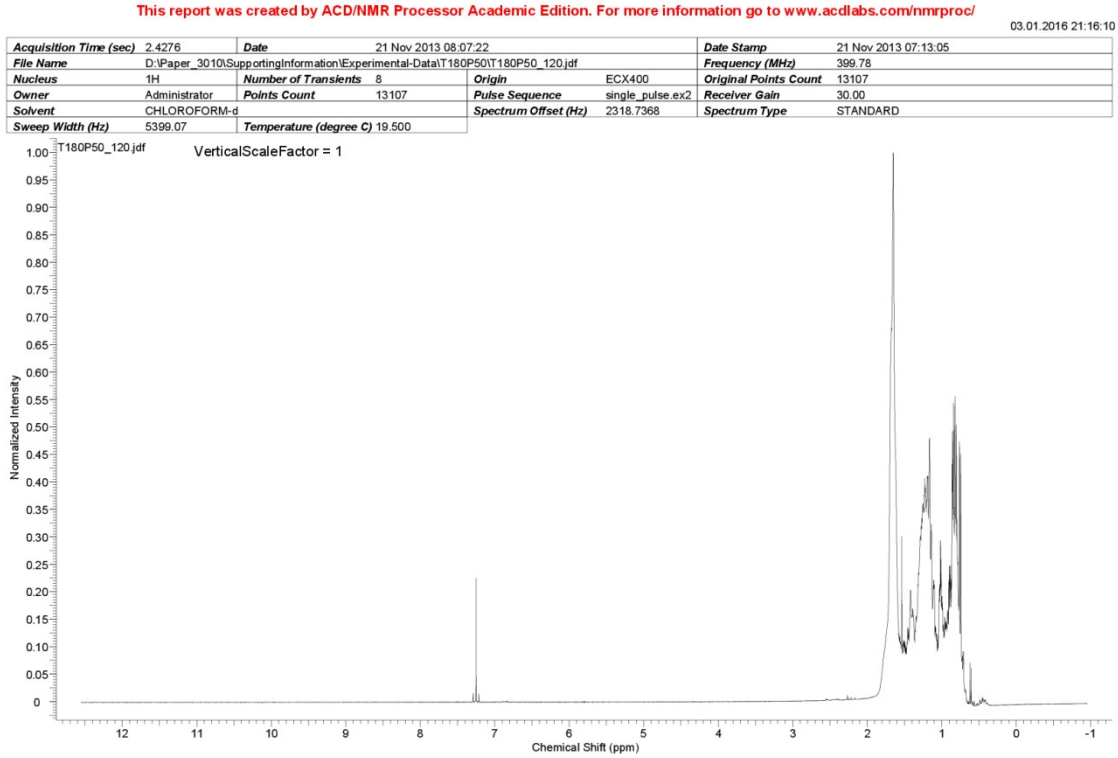

Figure S 70: Hydrogenation of Dibenzyltoluene t_{sample} = 120 min (T=180°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

T = 200 °C ; P = 50 bar

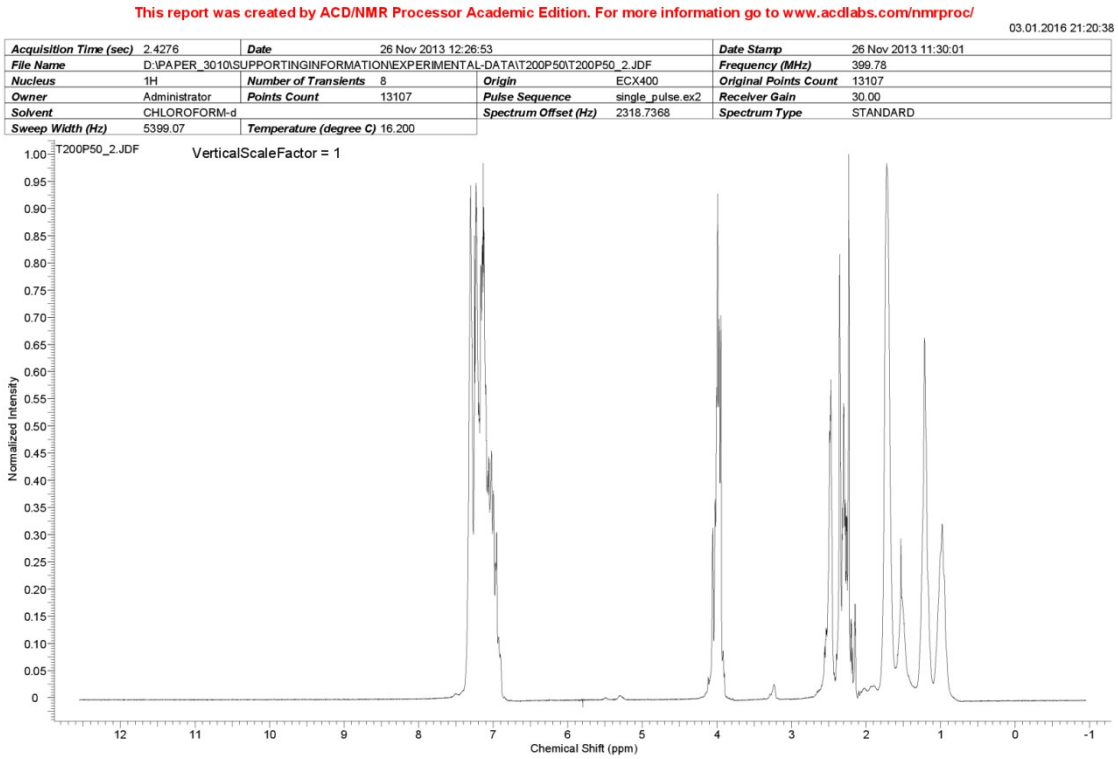

Figure S 71: Hydrogenation of Dibenzyltoluene t_{sample} = 2 min (T=200°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

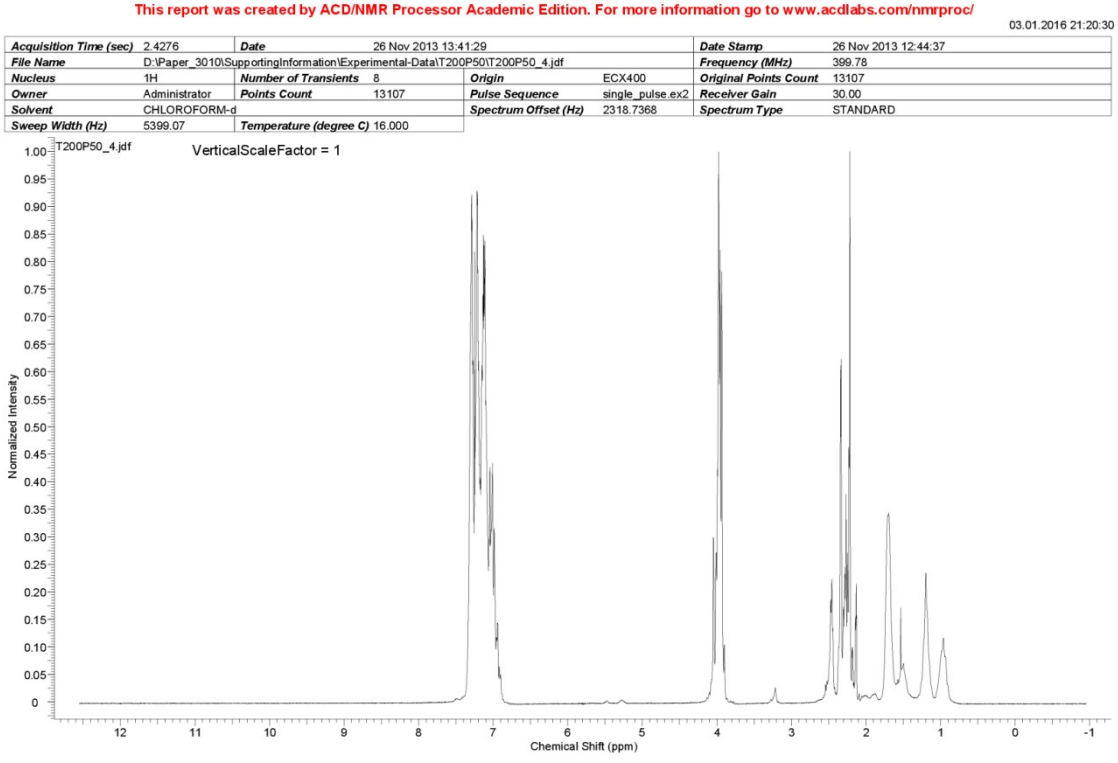

Figure S 72: Hydrogenation of Dibenzyltoluene t_{sample} = 4 min (T=200°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

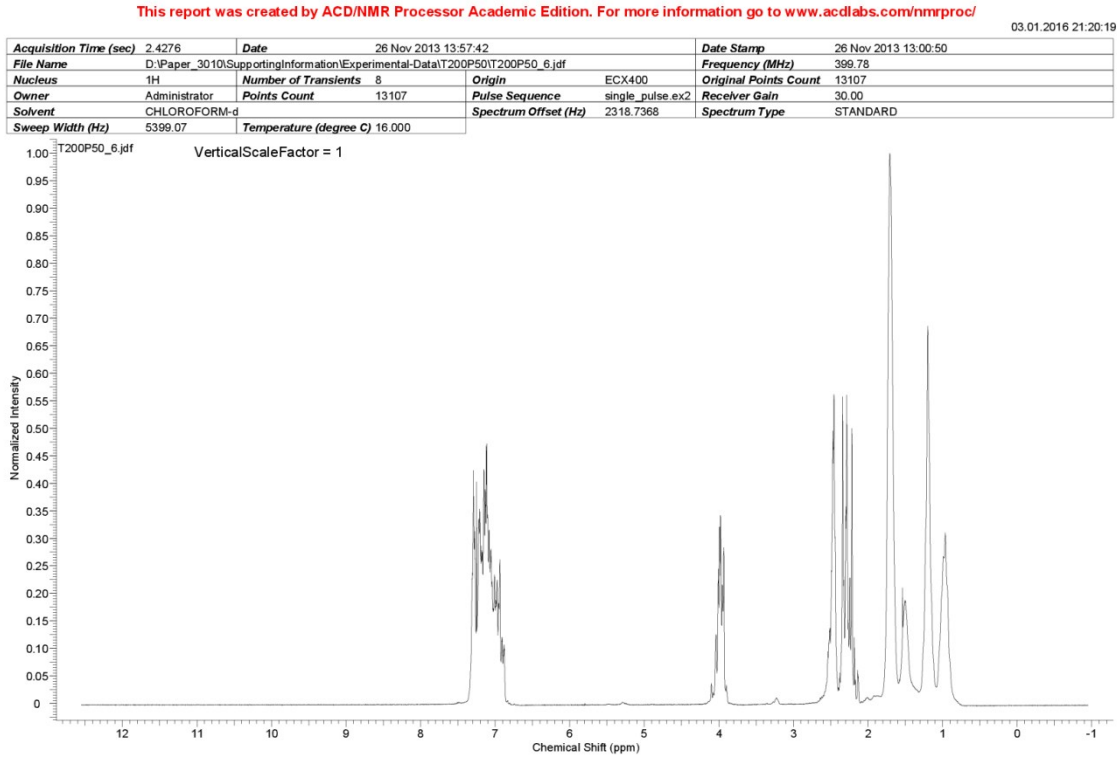

Figure S 73: Hydrogenation of Dibenzyltoluene t_{sample} = 6 min (T=200°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

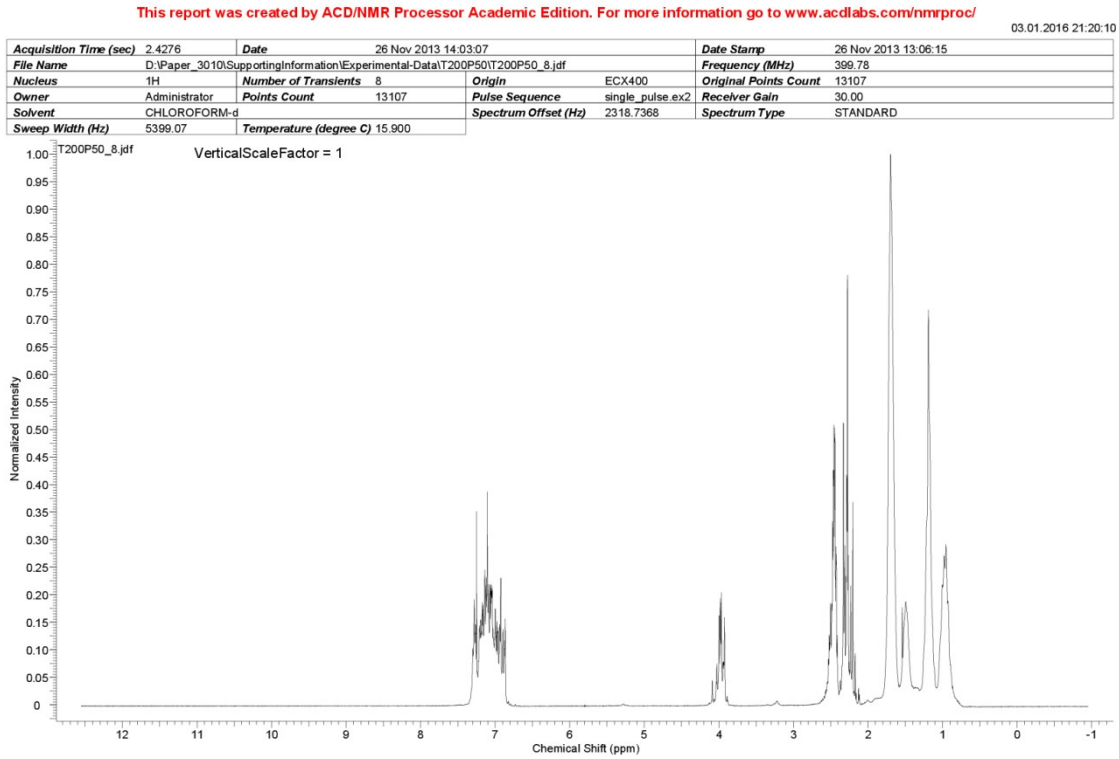

Figure S 74: Hydrogenation of Dibenzyltoluene t_{sample} = 8 min (T=200°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

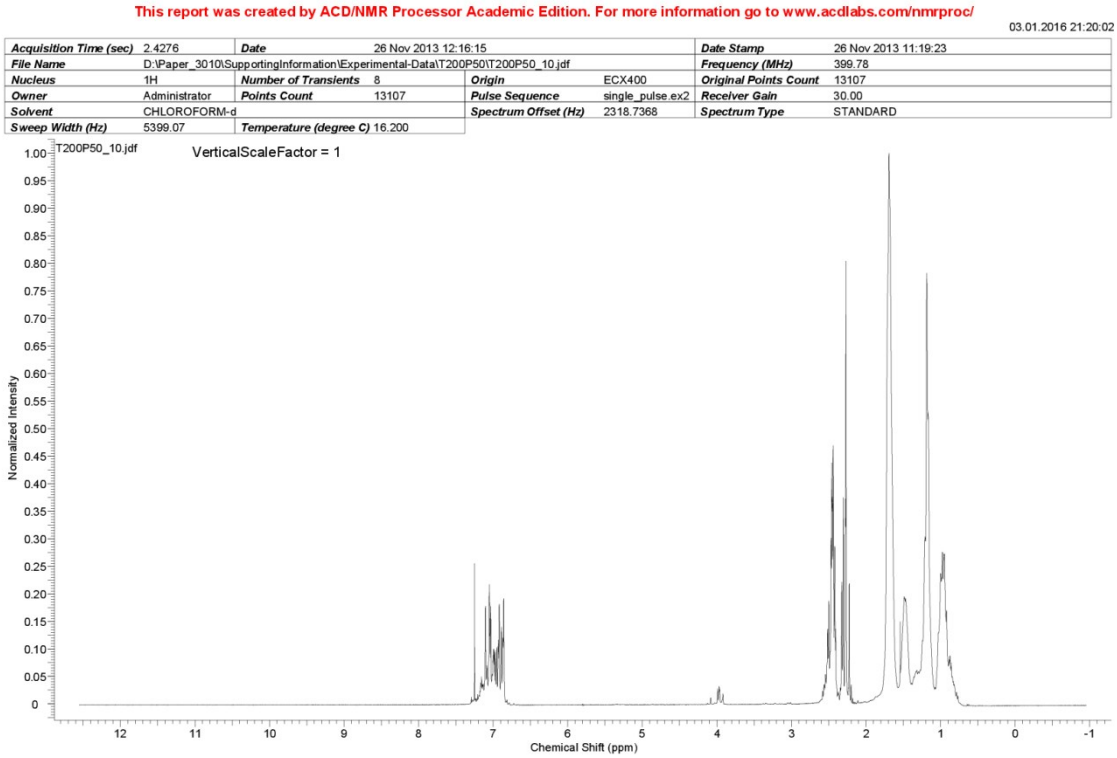

Figure S 75: Hydrogenation of Dibenzyltoluene t_{sample} = 10 min (T=200°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

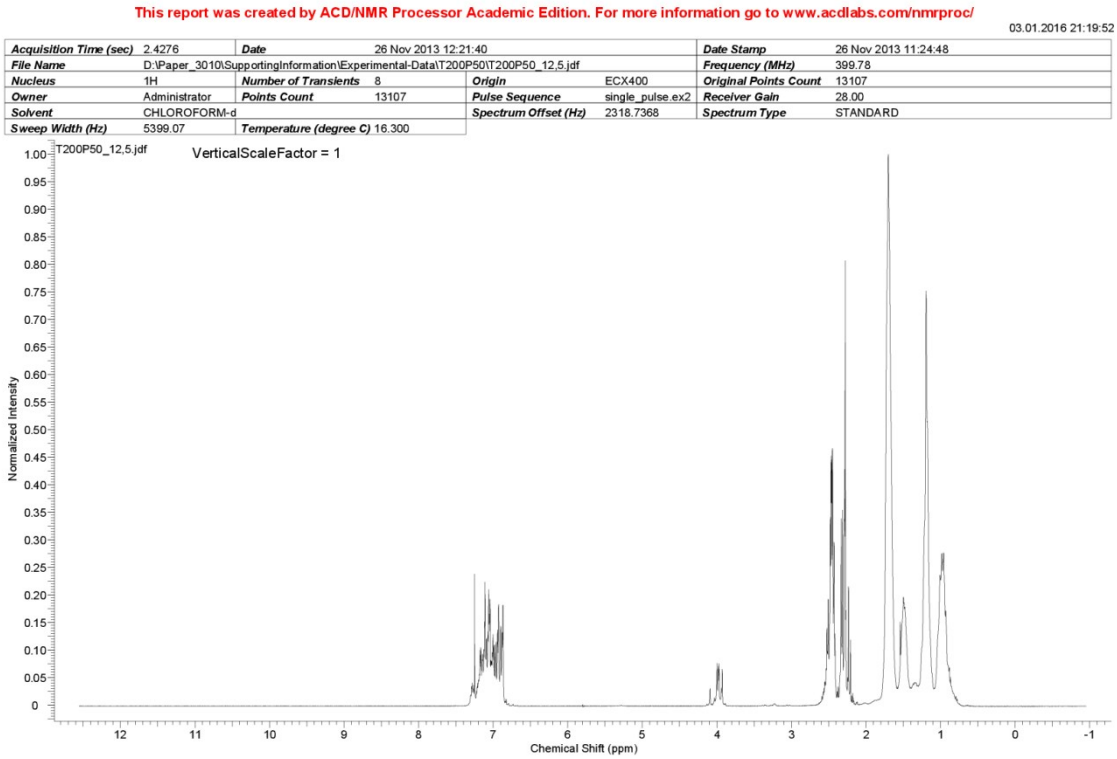

Figure S 76: Hydrogenation of Dibenzyltoluene t_{sample} = 12.5 min (T=200°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

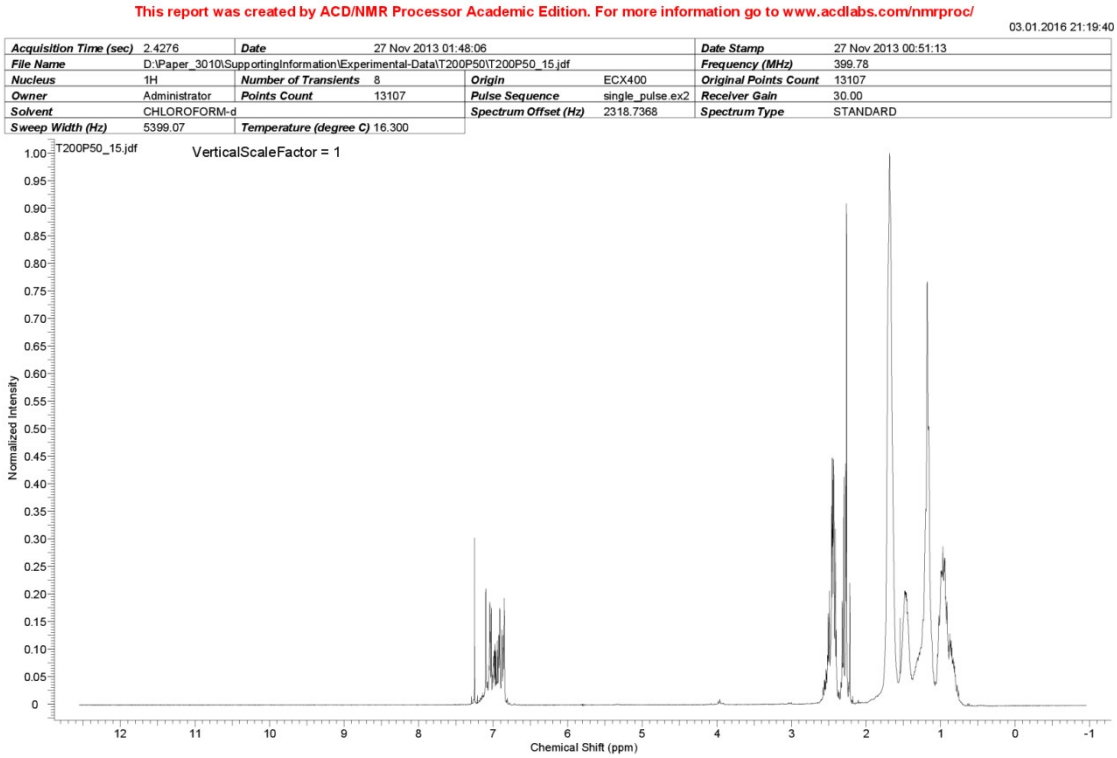

Figure S 77: Hydrogenation of Dibenzyltoluene t_{sample} = 15 min (T=200°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

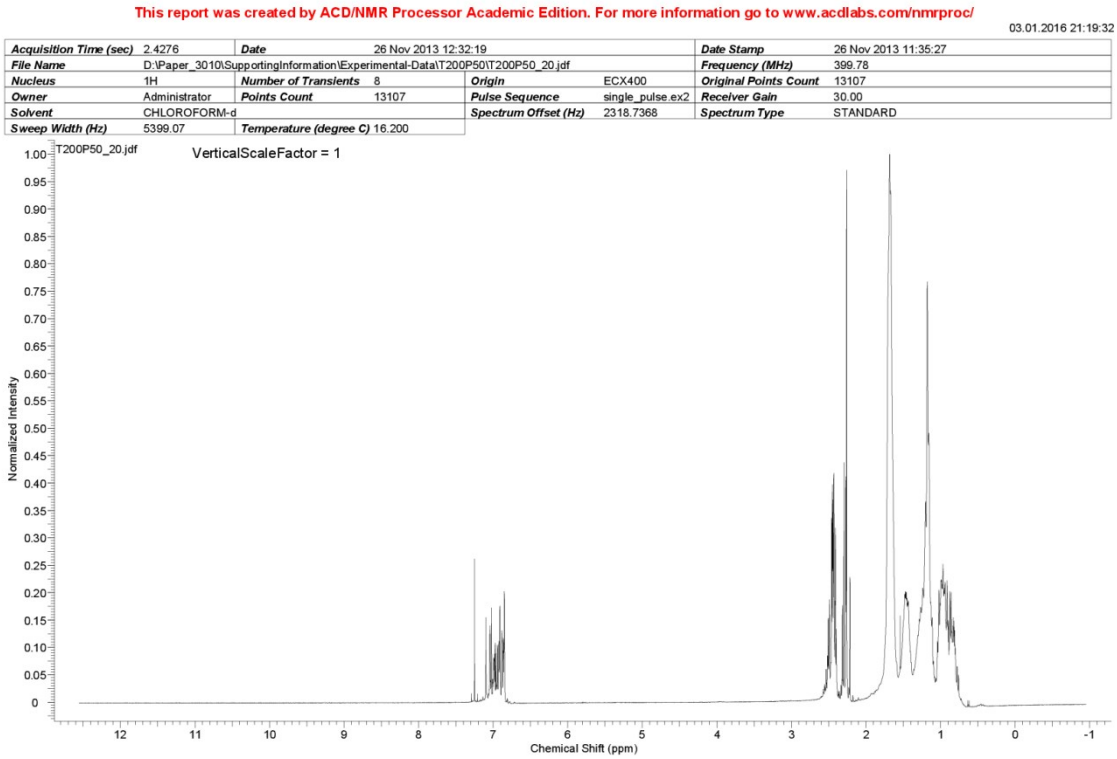

Figure S 78: Hydrogenation of Dibenzyltoluene t_{sample} = 20 min (T=200°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

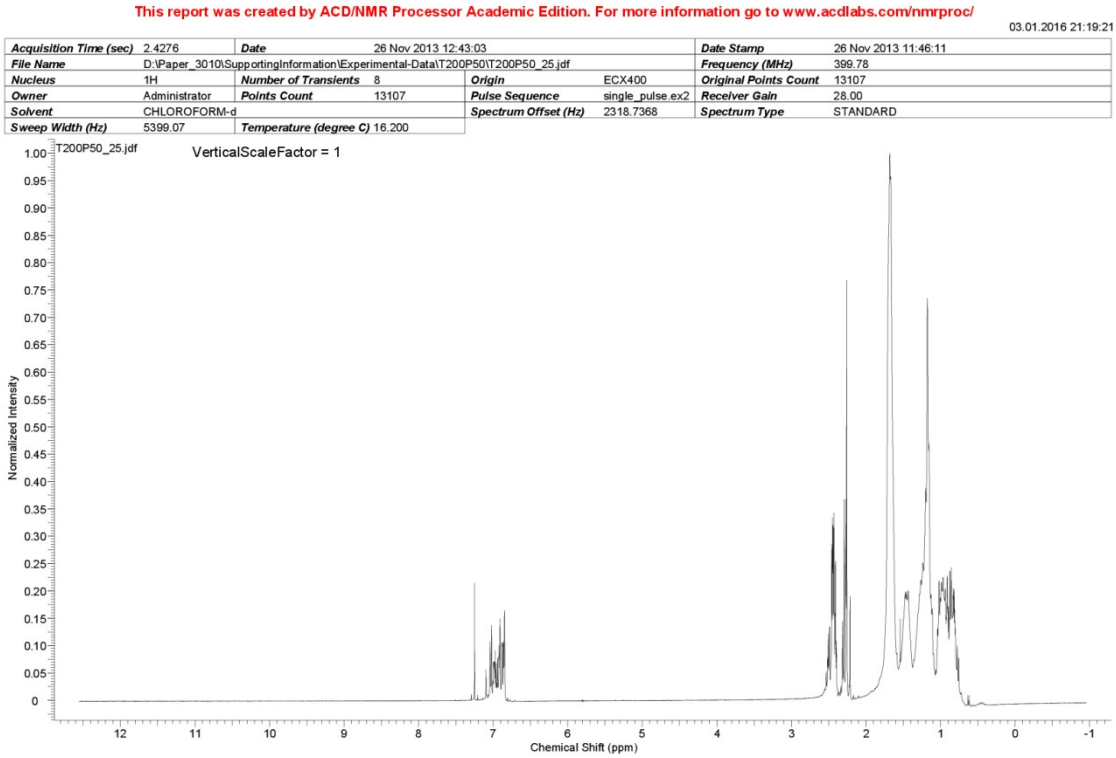

Figure S 79: Hydrogenation of Dibenzyltoluene t_{sample} = 25 min (T=200°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

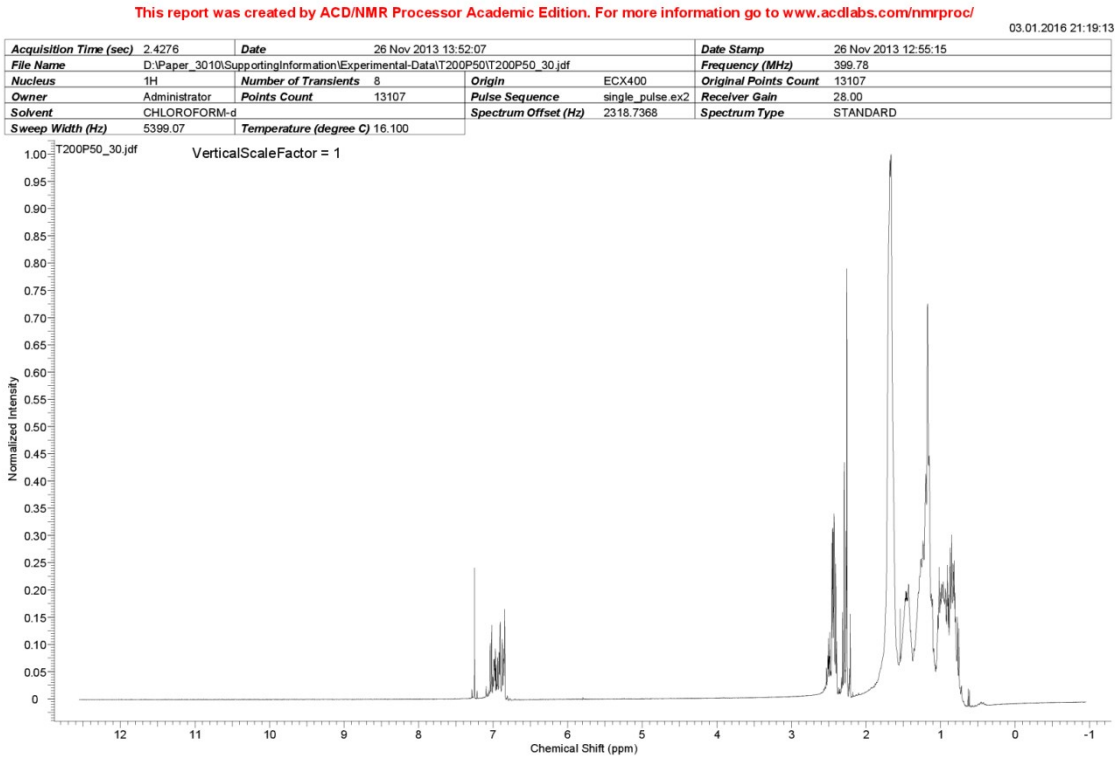

Figure S 80: Hydrogenation of Dibenzyltoluene t_{sample} = 30 min (T=200°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

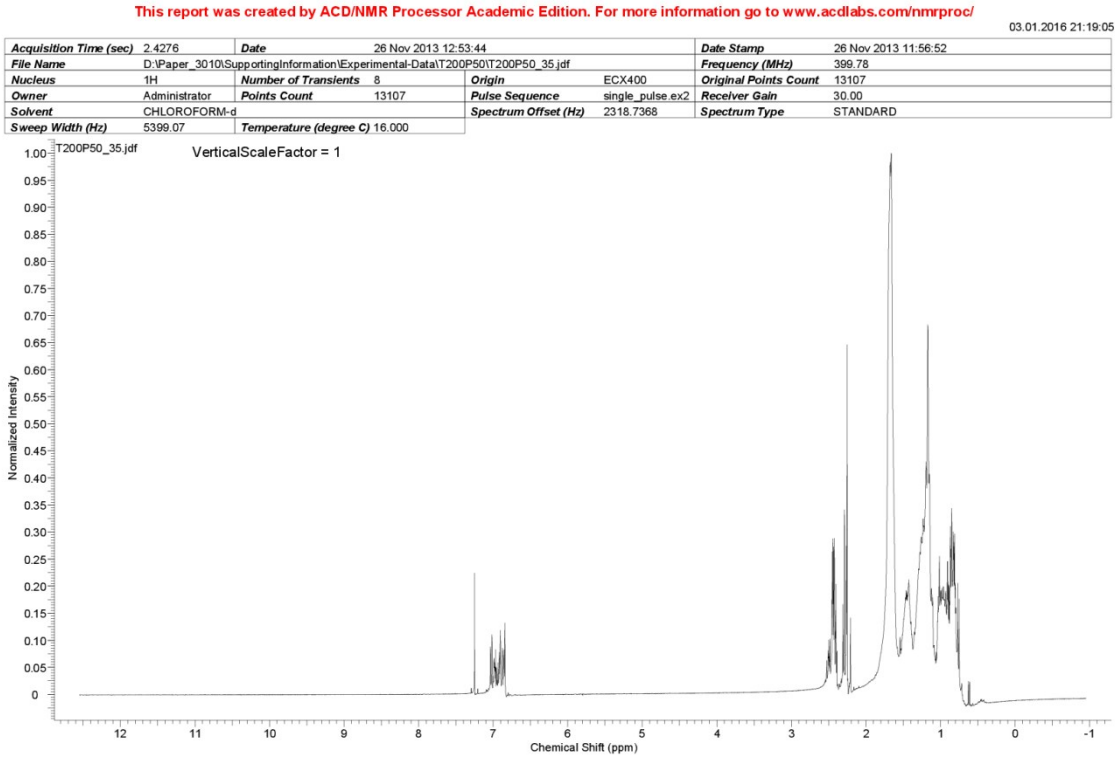

Figure S 81: Hydrogenation of Dibenzyltoluene t_{sample} = 35 min (T=200°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

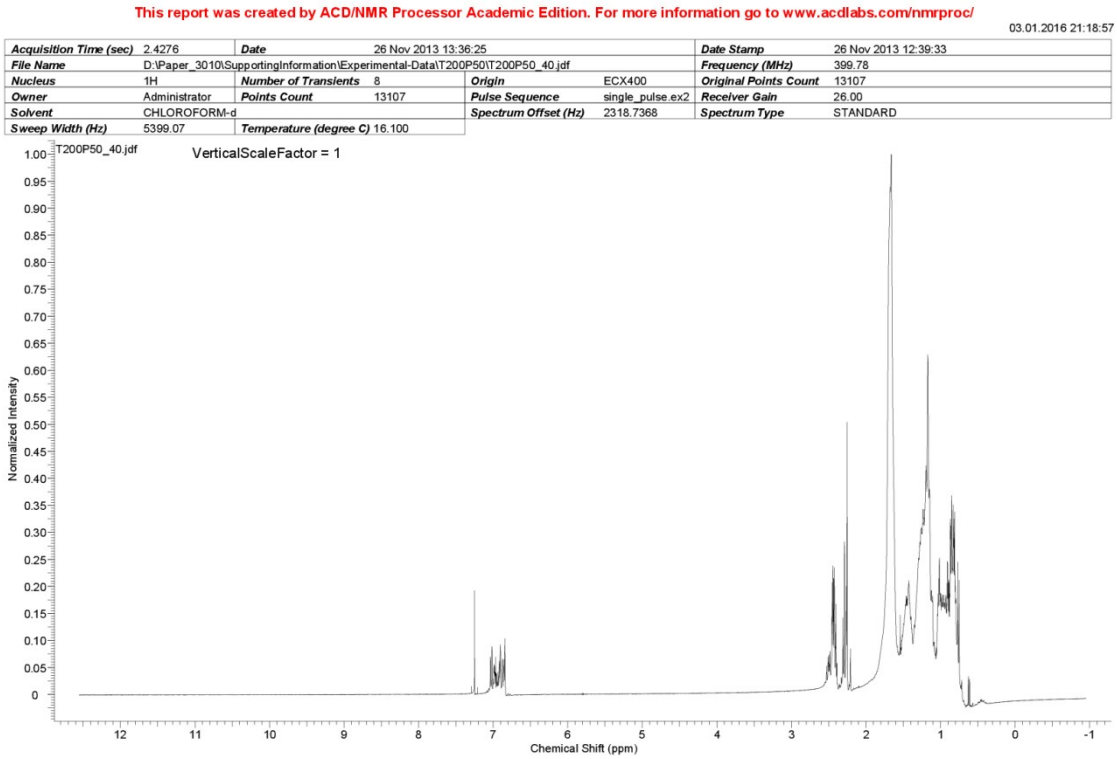

Figure S 82: Hydrogenation of Dibenzyltoluene t_{sample} = 40 min (T=200°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

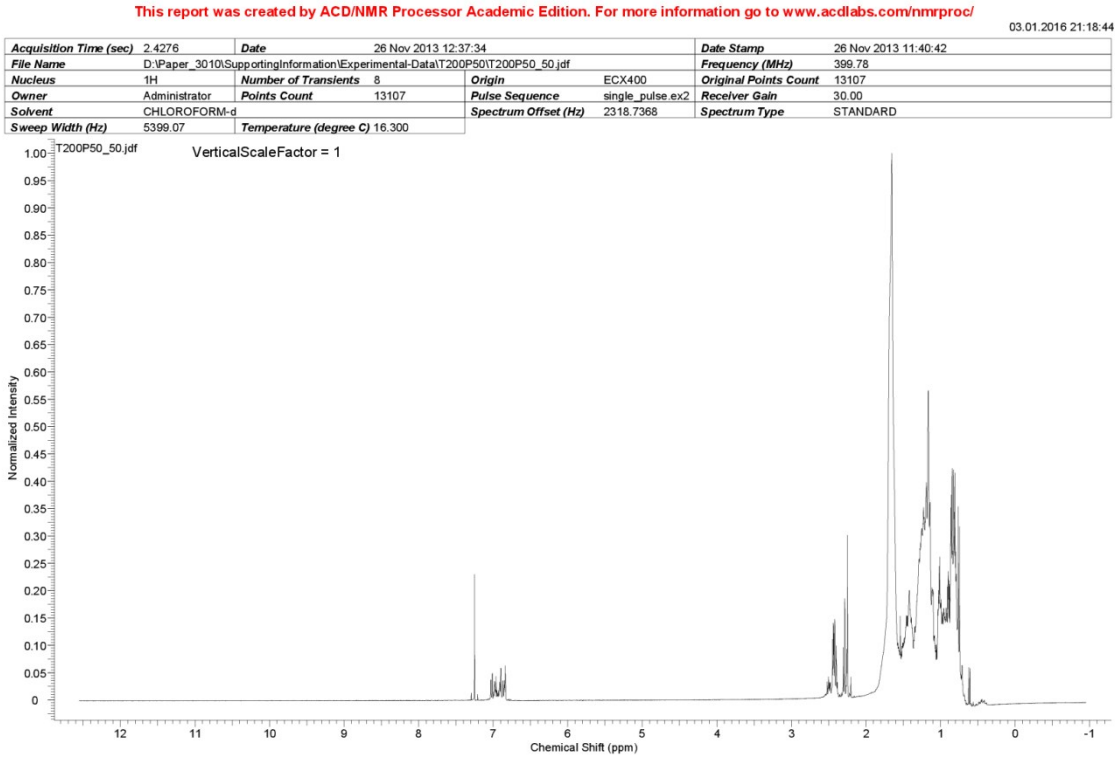

Figure S 83: Hydrogenation of Dibenzyltoluene t_{sample} = 50 min (T=200°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

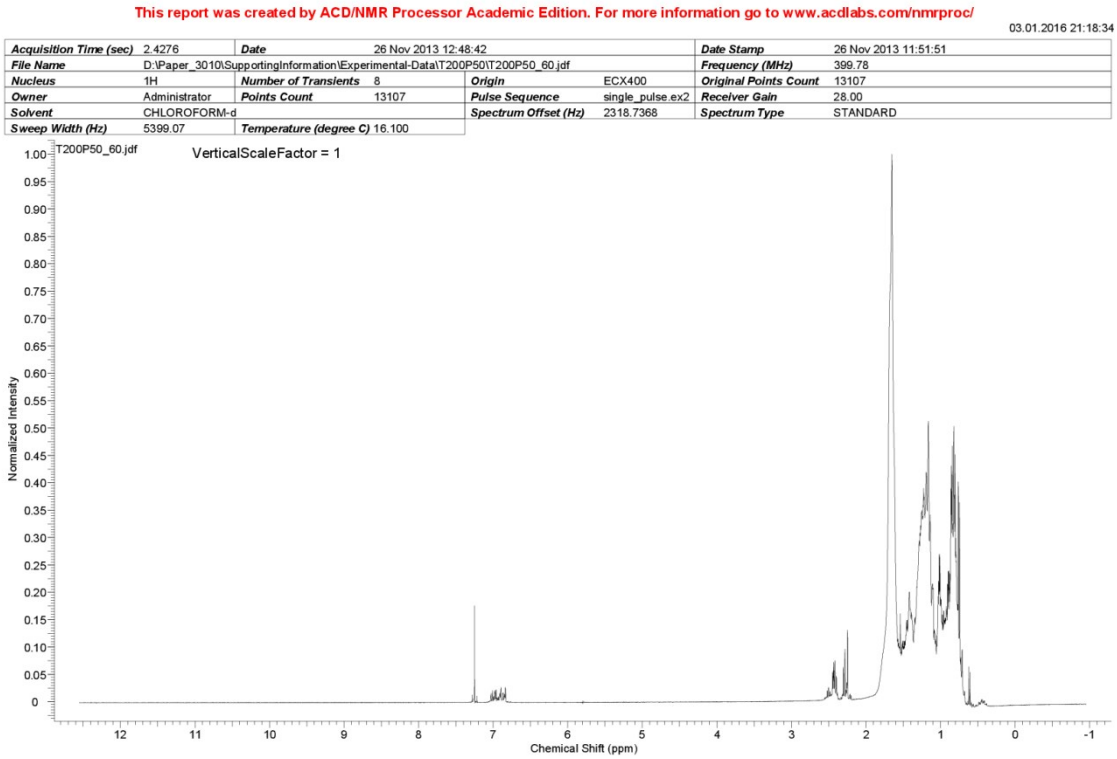

Figure S 84: Hydrogenation of Dibenzyltoluene t_{sample} = 60 min (T=200°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

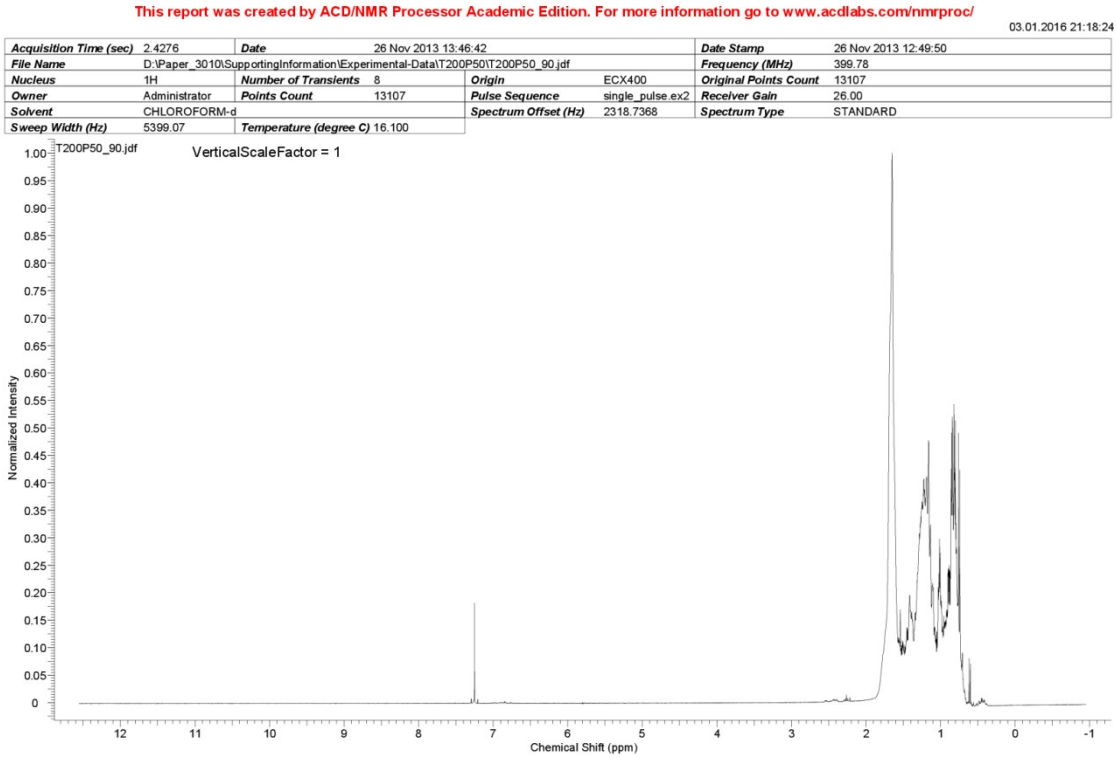

Figure S 85: Hydrogenation of Dibenzyltoluene t_{sample} = 90 min (T=200°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)

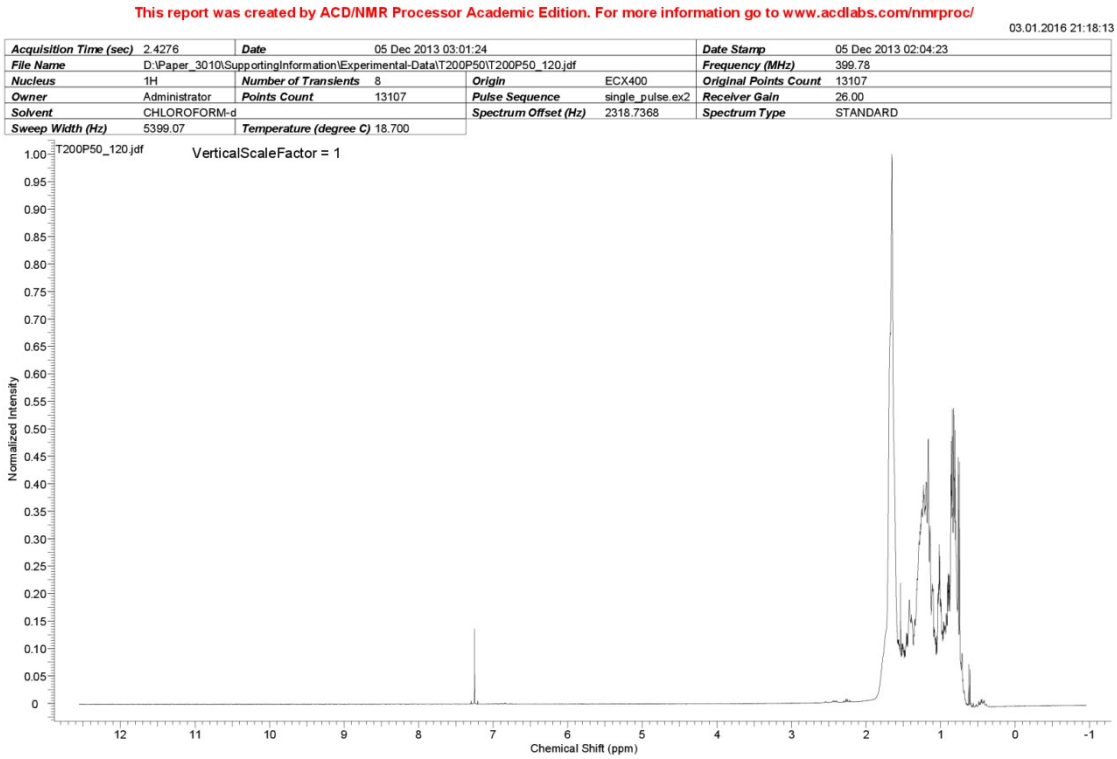

Figure S 86: Hydrogenation of Dibenzyltoluene t_{sample} = 120 min (T=200°C; P=50 bar; Cat.: 0.5 wt% Ru/Al_2O_3; m[H0-DBT] = 150 g; n_{Ru}/n_{Al2O3} = 0.25 mol%)