

Supporting information

Fast catalytic hydrogenation of 2,5-hydroxymethylfurfural to 2,5-dimethylfuran with ruthenium on carbon nanotubes

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Additional Catalyst testing

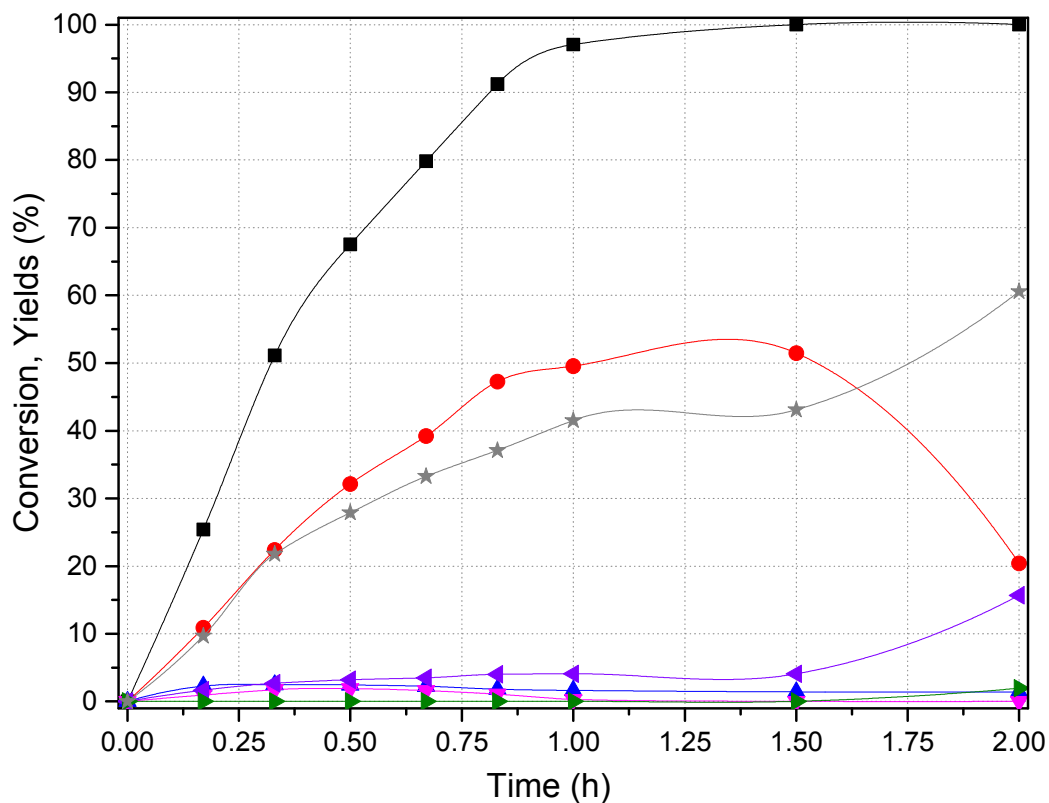


Figure S1. Conversion of HMF and product yields in HMF hydrogenation at 200 °C over 5%Ru/CNT. Reaction conditions: 30 mL of 40 mM HMF in dioxane; 60 mg of catalyst; 20 bar total pressure; 200 °C; 1100 rpm. Legend: conversion (■), yields: 2,5-dimethylfuran (●), 2,5-bis(hydroxymethyl)furan (▲), methylfuran (▼), 5-methylfurfuryl alcohol (◆), 2,5-dimethyltetrahydrofuran (◀), 2-hexanol (▶), other ring opening and hydrogenation products (*).

Table S1. Various physico-chemical properties of tested catalysts, such as real metal loading (Ru_{REAL}), average particle size (d_{Ru}), CO chemisorbed (CHS_{CO}), dispersion based on CO chemisorption (D_{CO}), turn-over frequencies at 30 % conversion of HMF (TOF_{X30}).

Sample	Ru _{REAL} , %	d _{Ru} , nm	CHS _{CO} , $\mu\text{mol g}^{-1}$	D _{CO} , %	TOF _{X30} , h ⁻¹
5 % Ru/C	5.2	2.03 \pm 0.44	122	23.7	58
1.5 % Ru/AC	-	-	16	10.8	86*
3 % Ru/AC	-	-	33	11.1	58*
5 % Ru/AC	2.98	1.85 \pm 0.73	66	22.4	36
1 % Ru/CNT	-	1.58 \pm 0.41	13.3	13.4	1226
3 % Ru/CNT	-	-	19.7	6.6	902
5 % Ru/CNT	4.88	1.53 \pm 0.48	40	8.3	820

*no DMF was produced