

Supplementary Materials: Novel Polymer–Silica Composite-Based Bifunctional Catalysts for Hydrodeoxygenation of 4-(2-Furyl)-3-Buten-2-One as Model Substance for Furfural–Acetone Aldol Condensation Products

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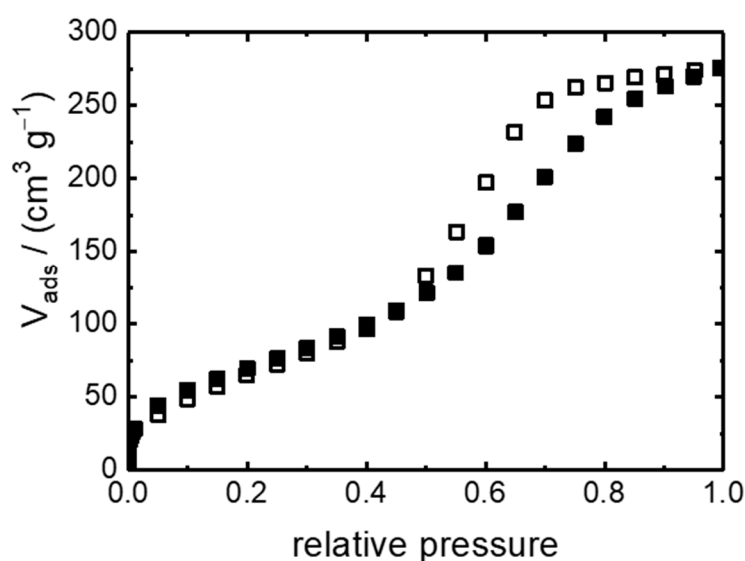


Figure S1. Volume adsorbed (V_{ads}) over relative pressure (p / p_0) from N_2 sorption for (1)Pt(13)PSC recorded at $-196\text{ }^\circ\text{C}$.

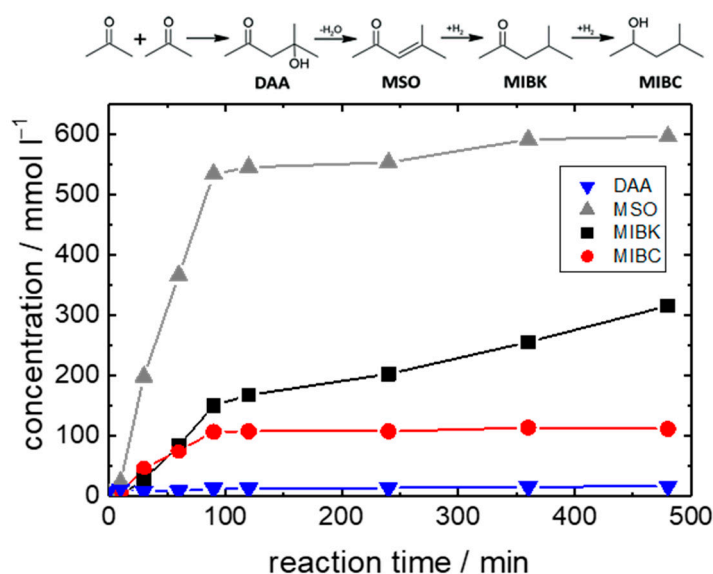


Figure S2. Reactant concentration of the self-condensation products of acetone over time for the HDO of FAc carried out using (1)Pt(13)PSC as a catalyst and acetone as a solvent ($T = 250\text{ }^\circ\text{C}$, $p_{\text{H}_2} = 100\text{ bar}$, $m_{\text{catalyst}} = 0.25\text{ g}$, 0.5 g FAc (24.5 mmol l^{-1}) dissolved in 150 ml acetone, stirring speed = 1000 min^{-1}).

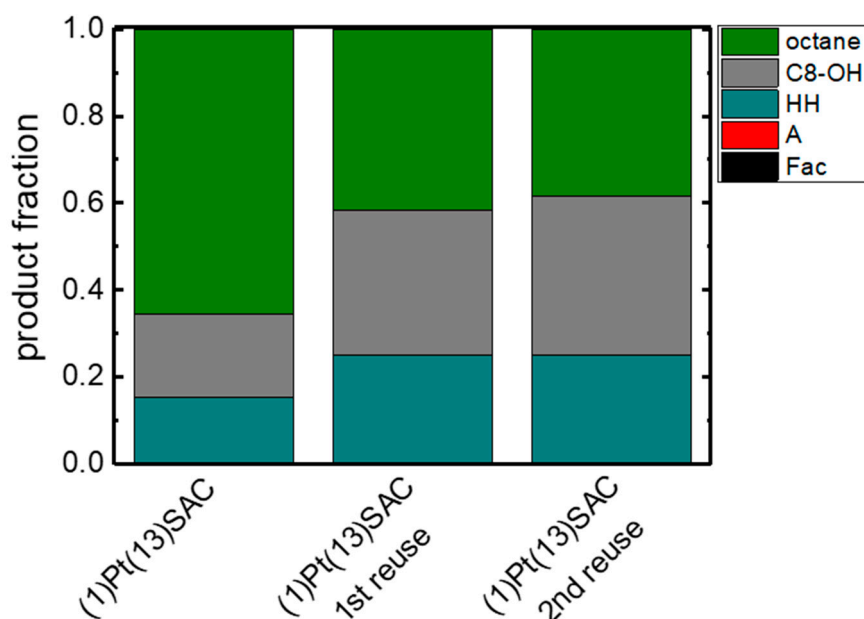


Figure S3. Product fractions obtained for the reusability studies of (1)Pt(13)PSC in the HDO of FAc ($T = 250\text{ }^{\circ}\text{C}$, $p_{\text{H}_2} = 100\text{ bar}$, $m_{\text{catalyst}} : m_{\text{FAc}} = 2 : 1$, $c_{\text{FAc}} = 24.5\text{ mmol l}^{-1}$, solvent: cyclohexane, stirring speed = 1000 min^{-1}). The catalyst was washed five times with 50 ml cyclohexane and subsequently dried for 5 h at $200\text{ }^{\circ}\text{C}$ in an air atmosphere between the experiments.

Table S1. Productivity (given as mmol octane produced per gram of noble metal and hour) and reaction conditions for the hydrodeoxygenation of 4-(2-furyl)-3-buten-2-one reported in literature and this work ((1)Ru(13)PSC)).

Catalyst	Productivity / (mmol g ⁻¹ h ⁻¹)	T / °C	p _{H₂} / bar	Solvent
Ru/SILP [1] ^a	0.5	150	120	(EMIM)NTf ₂
Pt/Al-SBA15 [2]	0.0	200	50	Cyclohexane
Pd/Al-MCM-41 [3]	90.9	80	40 ^b	scCO ₂
Pd/Nb ₂ O ₅ [4]	12.1	170	20	Cyclohexane
Pd/Nb ₂ O ₅ /SiO ₂ [5]	10.9	170	25	Cyclohexane
(1)Ru(13)PSC	165.3	250	200	Cyclohexane

^a using 4-(2-furyl)-butan-2-one (substance A, Figure 1) as reactant, ^b pCO₂ = 140 bar.

References

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