

Insights on the one-pot formation of 1,5-pentanediol from furfural with Co-Al spinel-based nanoparticles as an alternative to noble metal catalysts

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Table S1. Sample composition by EDX.

	CoAlO-as		CoAlO-r500		CoAlO-r700		CoAlO-r700used		CoAlO-r850	
	¹ Co/Al = 0.25		¹ Co/Al = 0.26		¹ Co/Al = 0.29		¹ Co/Al = 0.28		¹ Co/Al = 0.23	
Element	Wt.%	At.%	Wt.%	At.%	Wt.%	At.%	Wt.%	At.%	Wt.%	At.%
O	33.46	47.67	46.47	64.61	42.97	60.56	39.29	51.91	39.16	56.99
Al	37.03	31.27	33.99	28.02	34.75	29.62	32.07	25.16	40.53	34.98
Co	20.39	7.89	19.54	7.37	22.27	8.82	19.66	7.09	20.31	8.03
C	5.32	10.09	--	--	--	--	8.99	15.85	--	--
Si*	3.79	3.08	--	--	--	--	--	--	--	--

¹Atomic ratio of bulk material calculated by EDX.

*From substrate used for analysis.

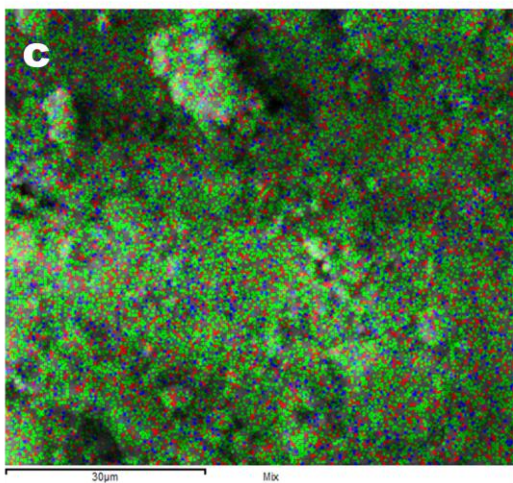
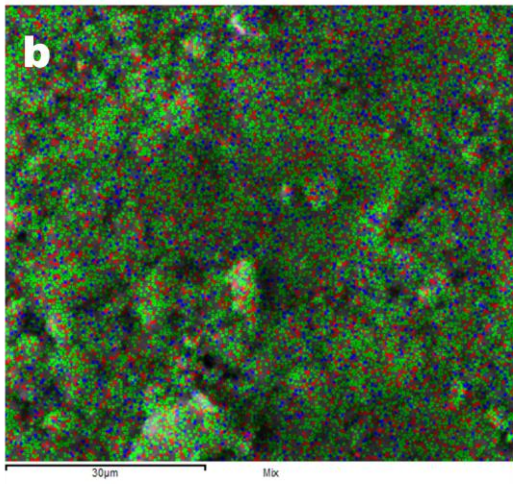
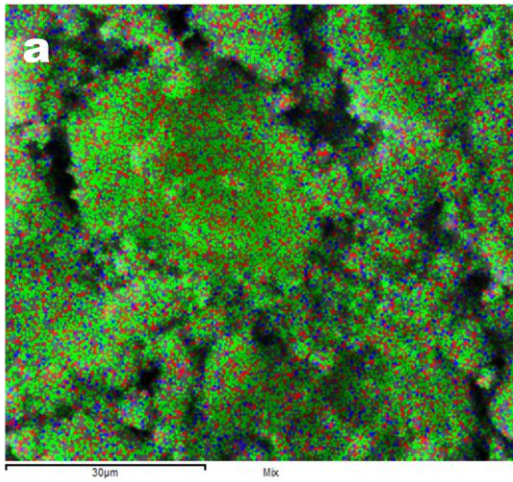


Figure S1. SEM images with elemental mapping of total components. (Comment: Red O; Green Al; Blue Co).

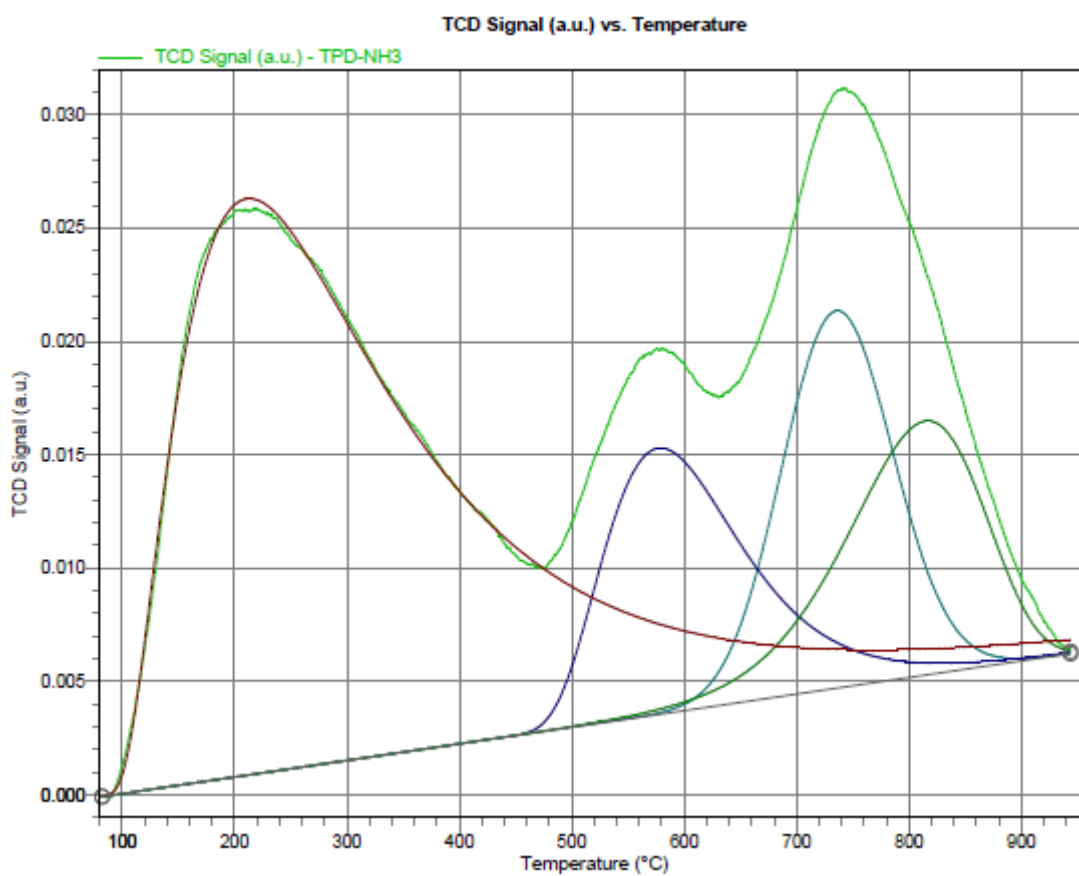


Figure S2. Deconvoluted TPD-NH₃ of Co-spinel reduced at 500 °C.

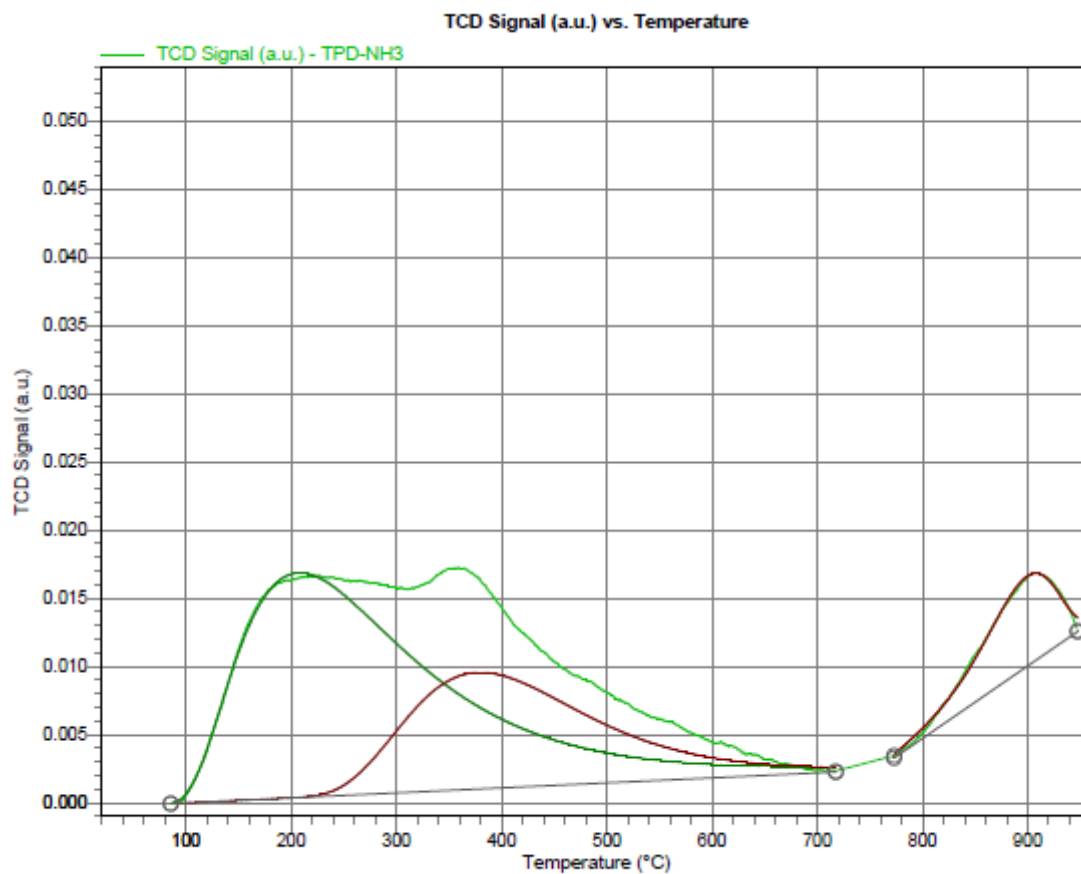


Figure S3. Deconvoluted TPD-NH₃ of Co-spinel reduced at 700 °C.

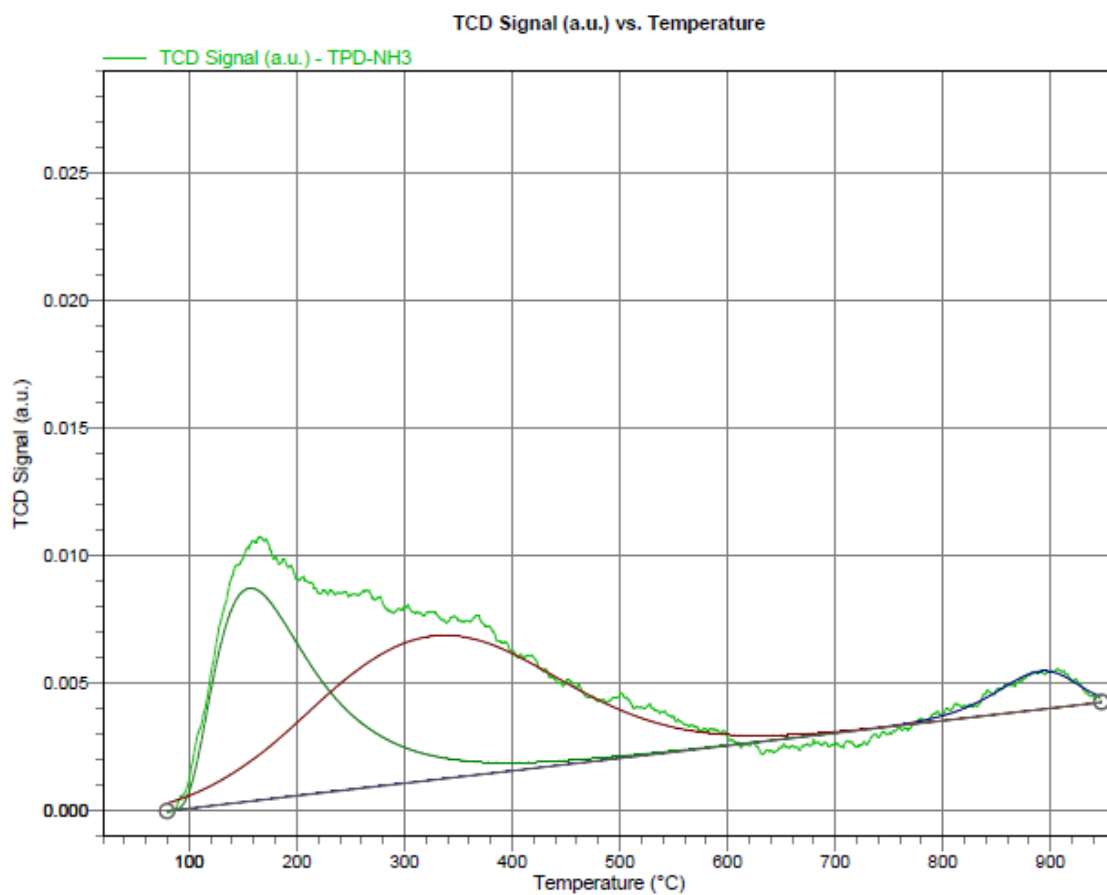


Figure S4. Deconvoluted TPD-NH₃ of Co-spinel reduced at 850 °C.

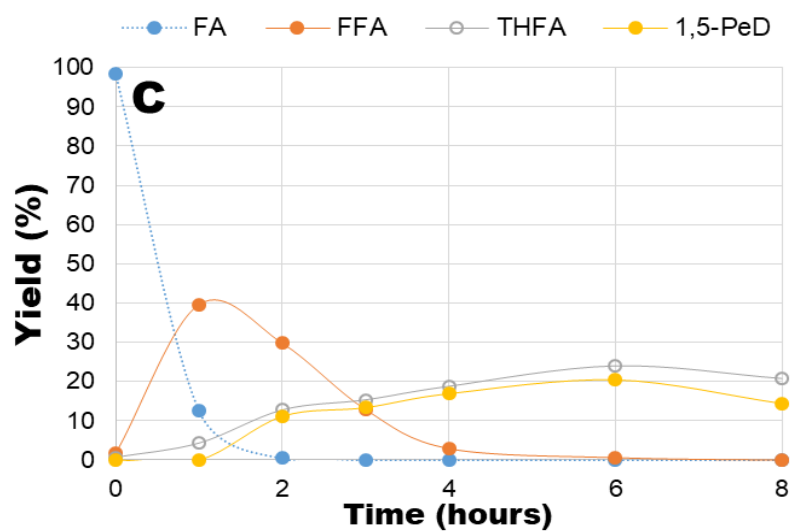
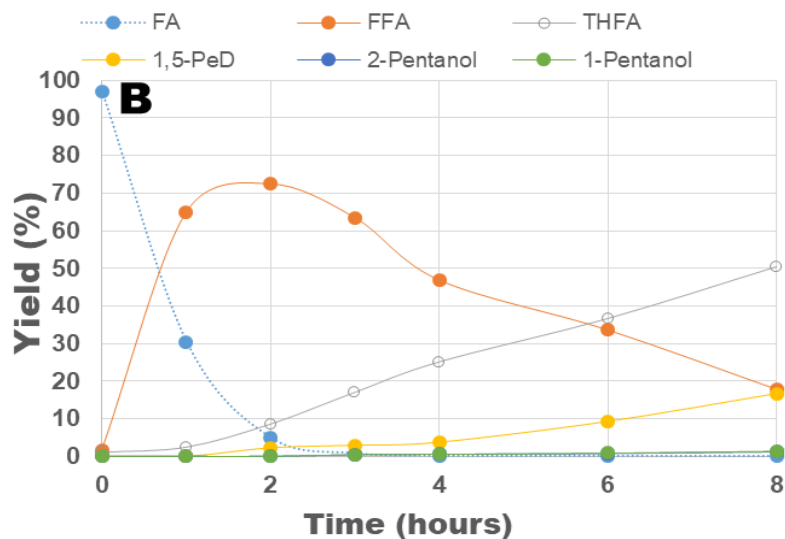
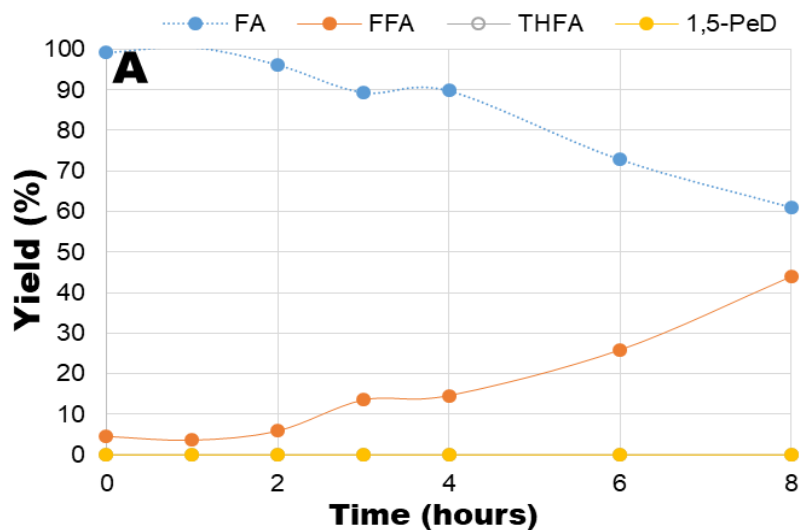


Figure S5. Products evolution with time in the FA reduction reaction with 40 mg of catalyst reduced at 850 °C, 20 bar H₂, 1000 rpm, and different reaction temperatures: a) 130 °C; b) 150 °C and c) 170 °C.

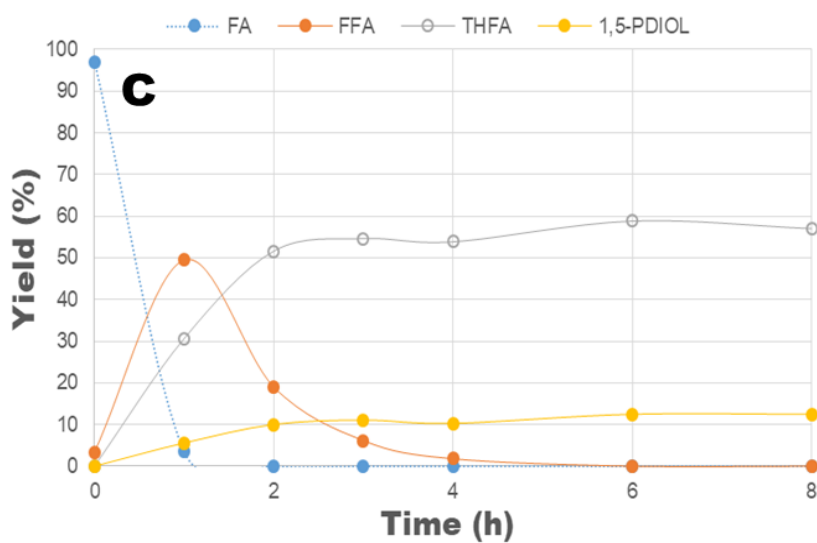
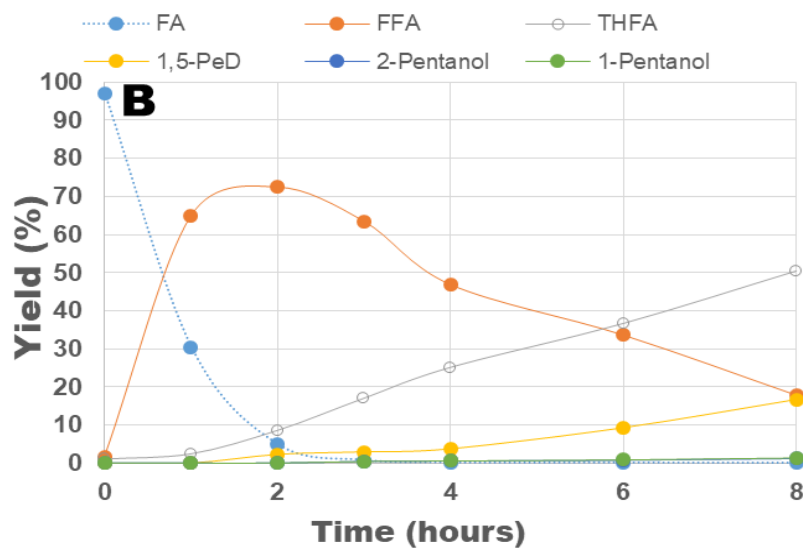
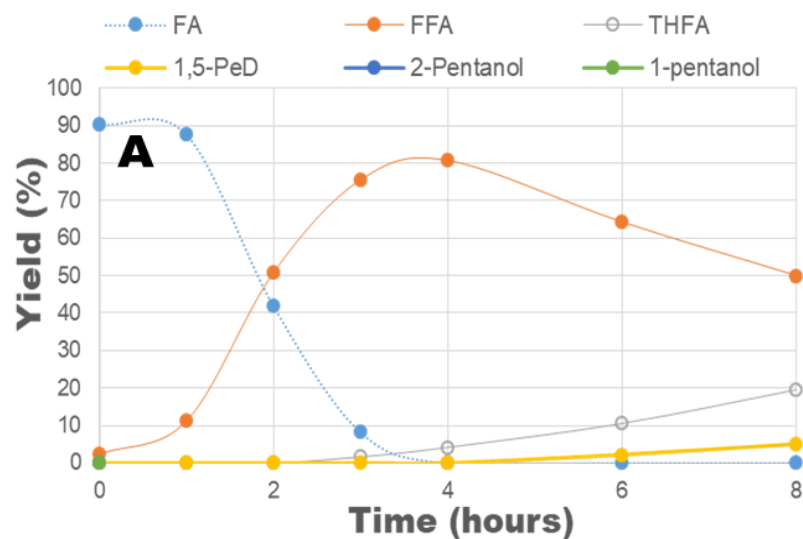


Figure S6. Products evolution with time in the FA reduction reaction at 150 °C with catalyst reduced at 850 °C, 20 bar H₂, 1000 rpm, and different mass of catalyst: a) 20 mg (5wt%); b) 40 mg (10 wt%) and c) 80 mg (20 wt%).

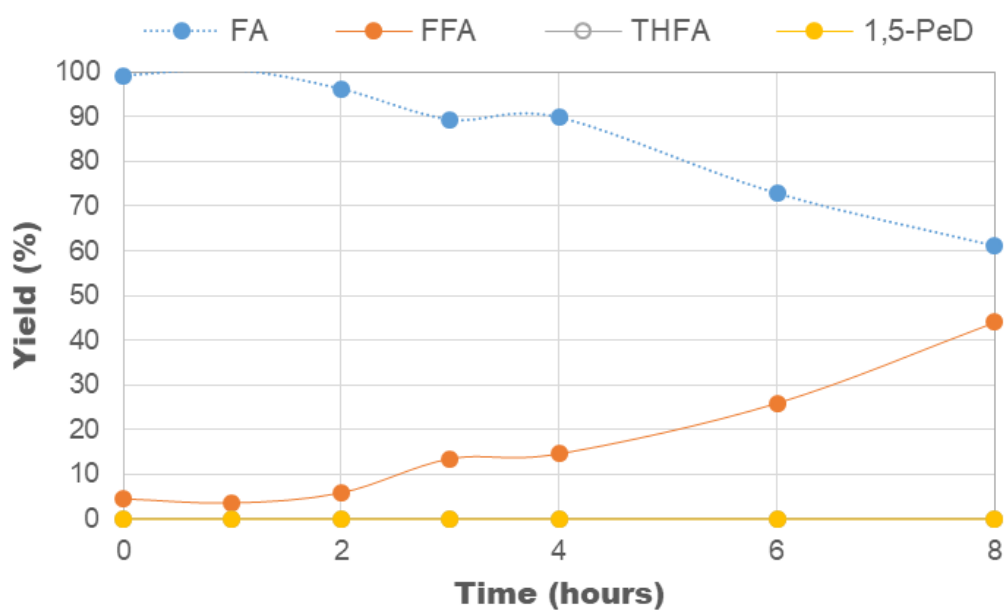


Figure S7. Products evolution with time in the FA reduction reaction with Co-spinel as-synthesized (not reduced). Reaction conditions: 150 °C, 20 bar H₂, 40 mg catalyst.

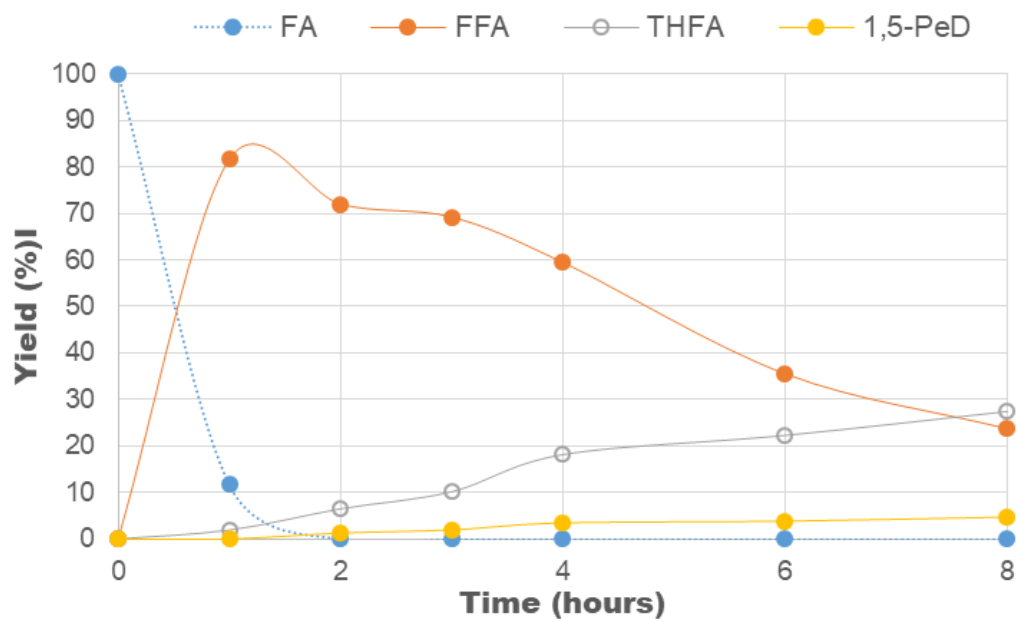


Figure S8. Products evolution with time in the FA reduction reaction. Reaction conditions: 150 °C, 20 bar H₂, 40 mg catalyst reduced at 500 °C.

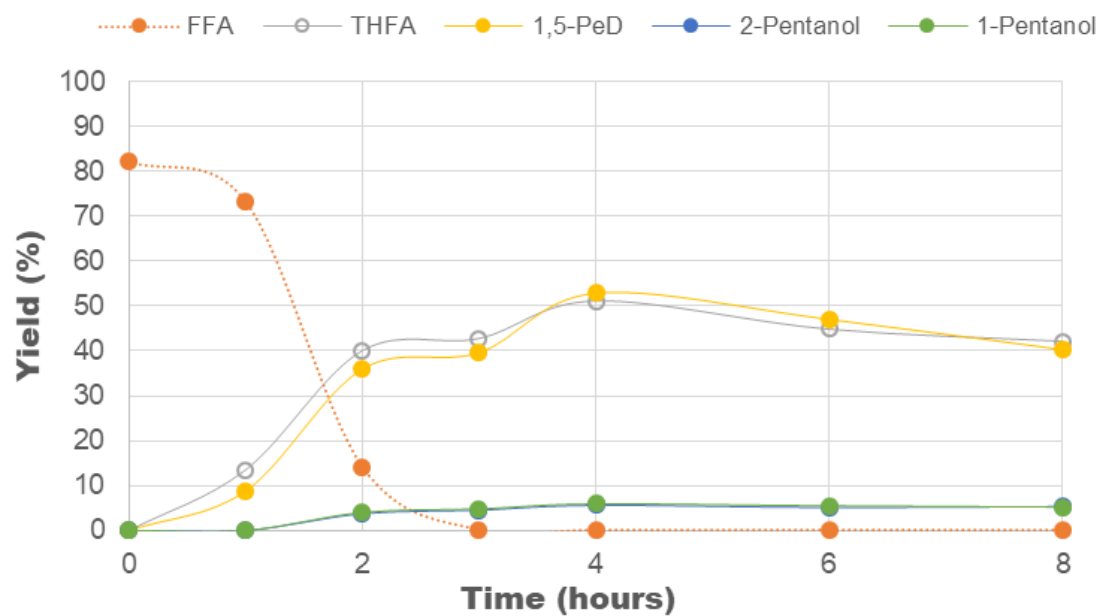


Figure S9. Products evolution with time in the furfuryl alcohol (FFA) reduction reaction. Reaction conditions: 150 °C, 30 bar H₂, 40 mg catalyst reduced at 700 °C.

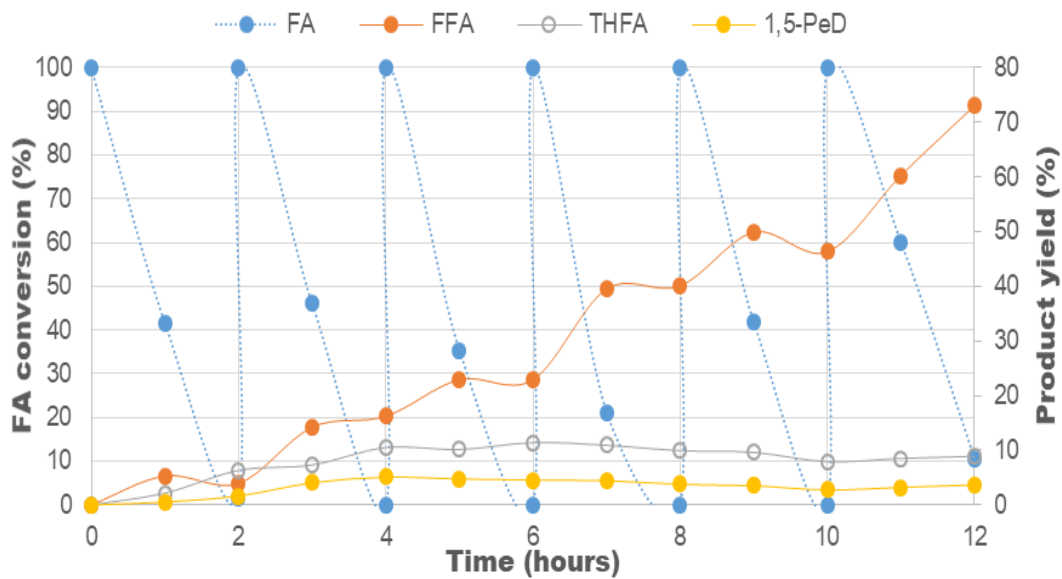


Figure S10. Products evolution with time in the semi-batch furfural reduction reaction with CoAl-spinel reduced at 700 °C. Reaction conditions: 150 °C, 30 bar H₂, 40 mg catalyst.

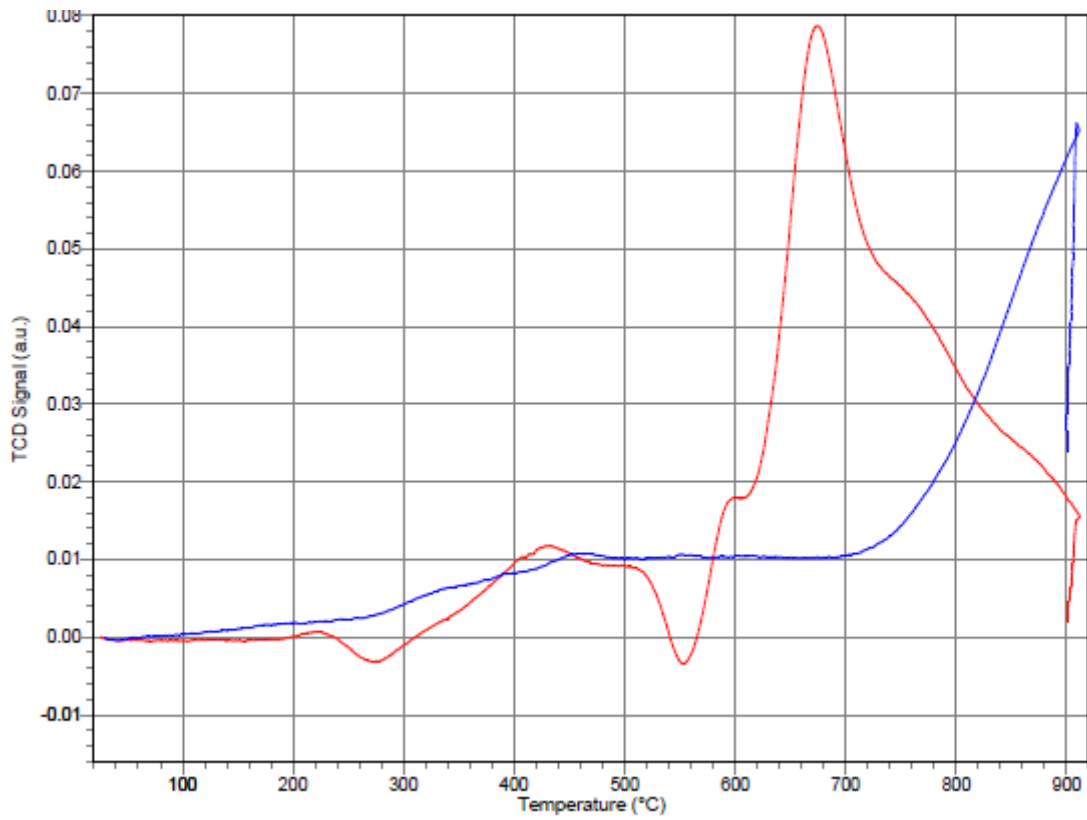


Figure S11. TPR cycles of CoAlO-as (in red) and CoAlO-r700 used after calcination at 300 °C (in blue).