SUPPORTING INFORMATION

From biomass-derived furans to aromatic compounds: Design of Al-Nb-SBA-15 mesoporous structures and study of their acid properties on catalytic performance.

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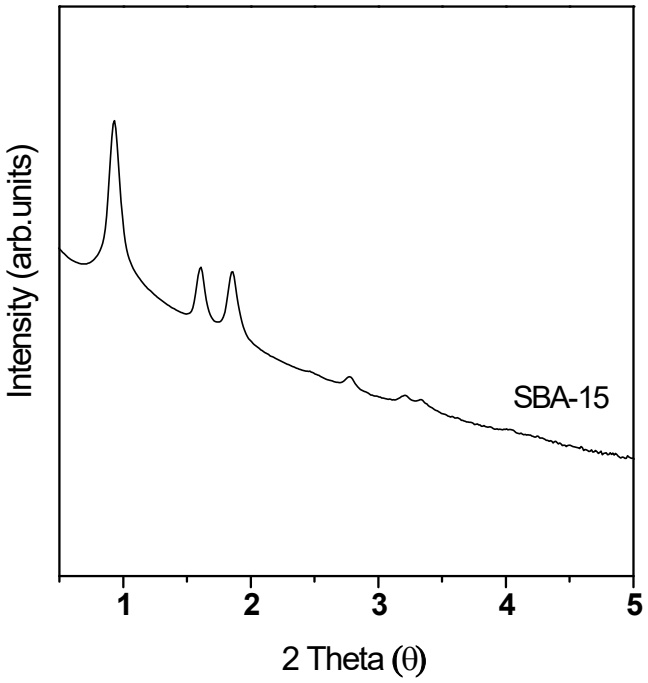
Catalysts characterization

Figure S1. SAXS pattern of SBA-15 sample (taken of Elías et al. [34]) and XRD patterns at high angle of the synthetized samples.



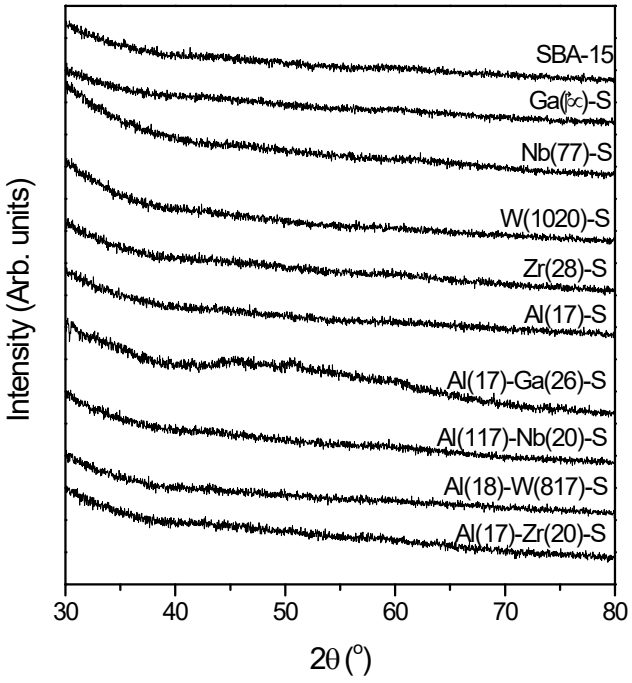
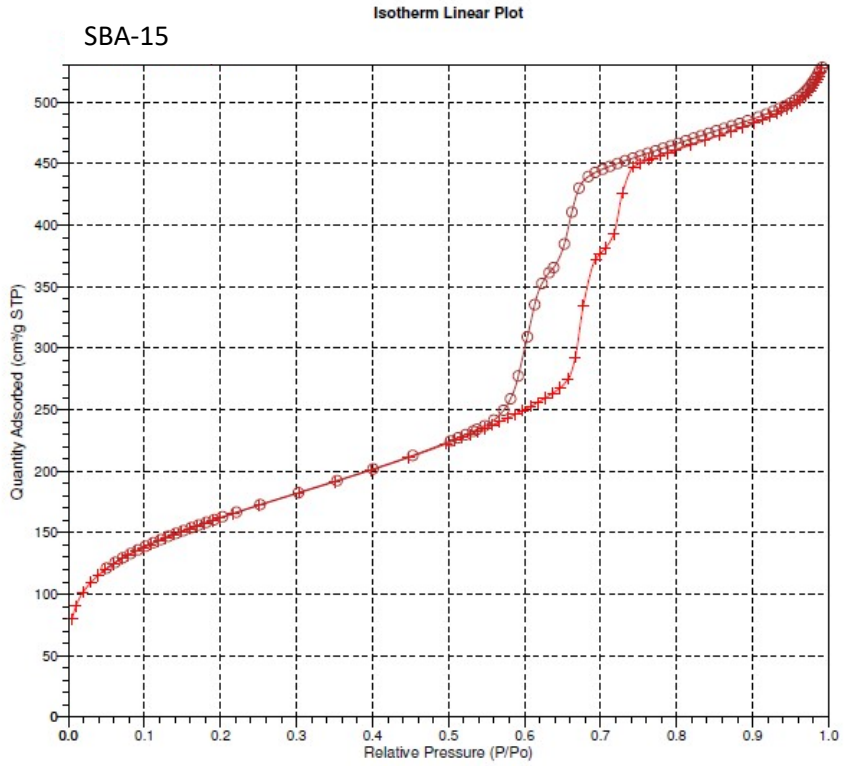
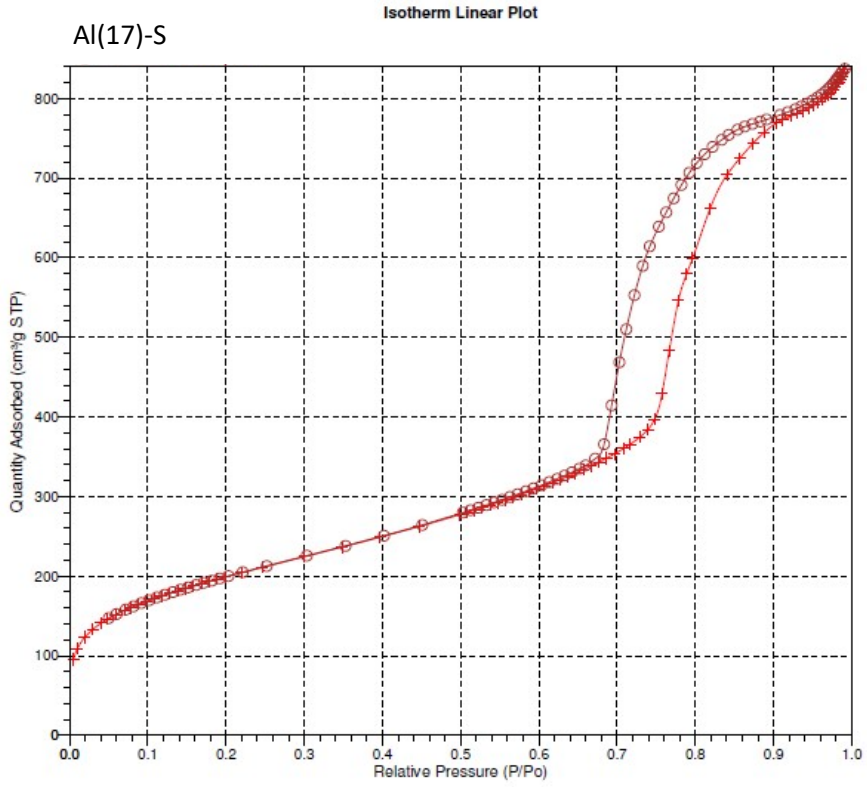


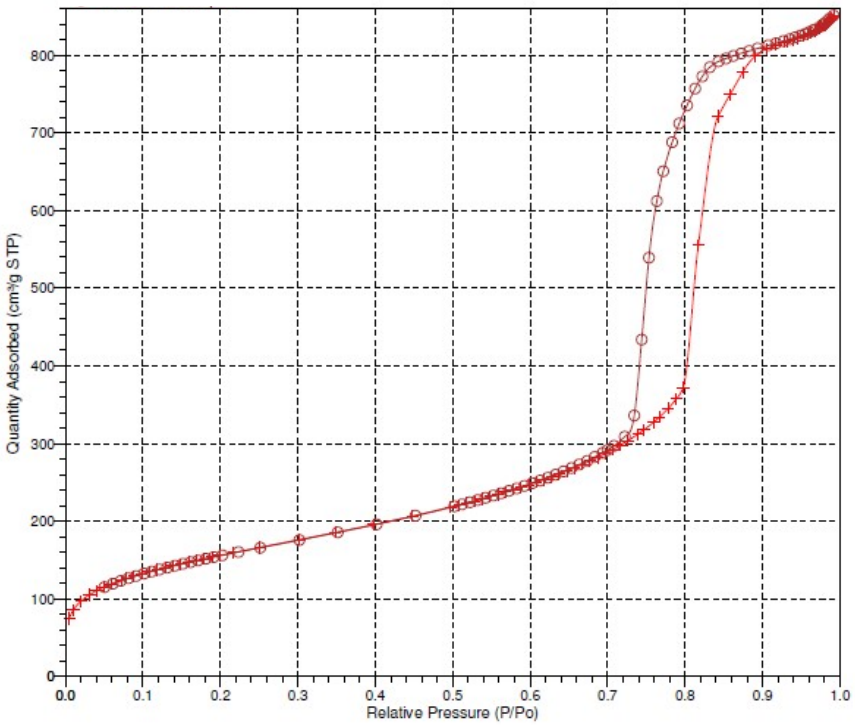
Figure S2: N_2 adsorption-desorption isotherms for synthetized catalysts.





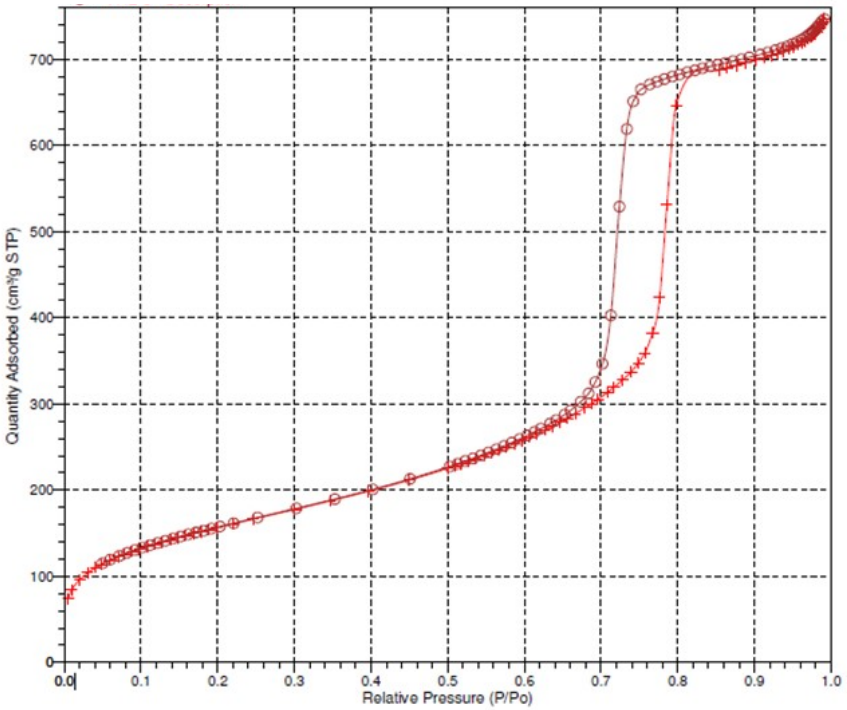
Isotherm Linear Plot

Al(117)-Nb(20)-S



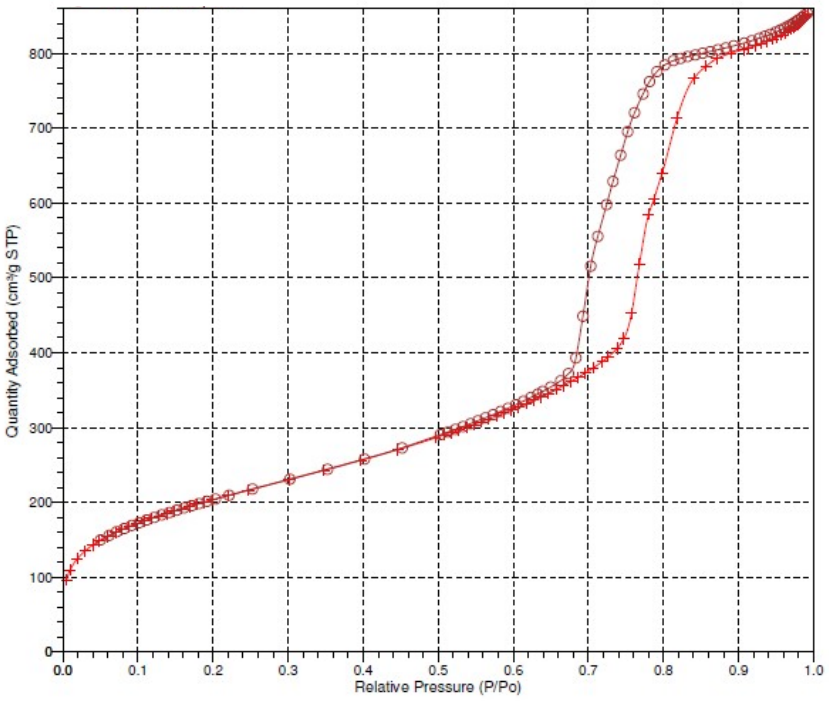
Isotherm Linear Plot

Al(17)-Zr(20)-S



Isotherm Linear Plot

Al(18)-W(817)-S



Isotherm Linear Plot

Al(17)-Ga(26)-S

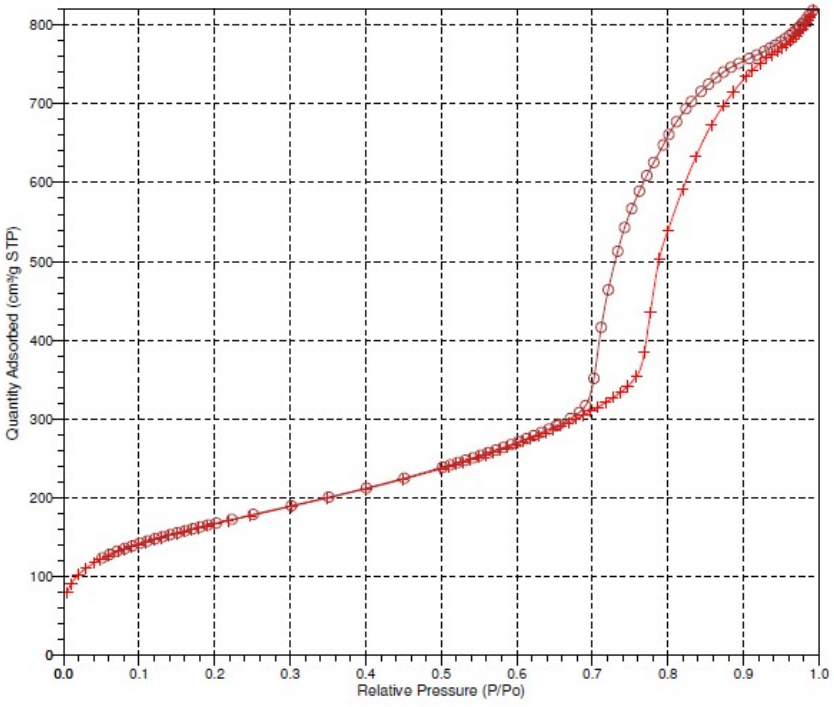
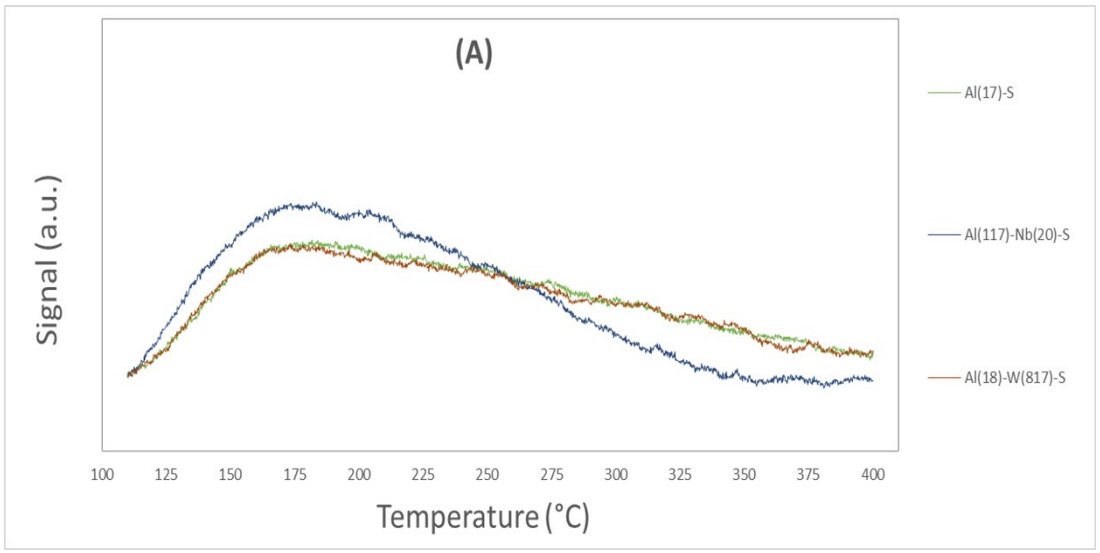
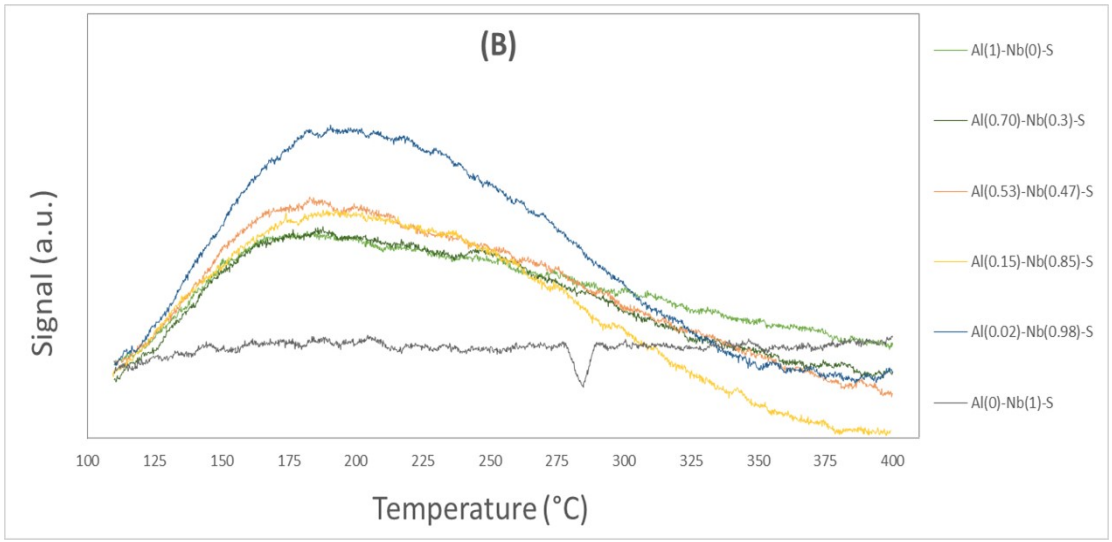


Figure S3: Profiles of NH_3-TPD measurements for synthetized catalysts, (A) mono-and bimetallic catalysts, (B) Al-Nb-SBA-15 catalysts.





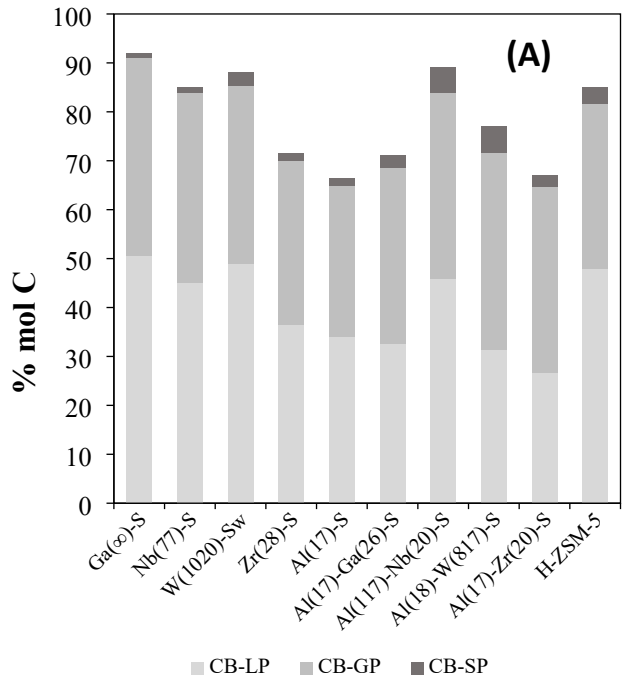
Catalytic tests

Table S1: Catalytic results in the aromatization reaction over different SBA-15 modified catalysts.

	Conversion		Selectivity (in liquid fraction)				
Catalyst	X_{DMF} (mol%)	X_{C2H4} (mol%)	$S_{p\text{-}xylene}$	$S_{hexanedione}$	$S_{other\ aromatics}$	p-xy Yield (mol%)	Hexanedione Yield (mol%)
SBA-15	21.68	13.85	37.72	29.66	10.96	4.00	3.15
Al-S(17)	77.17	39.27	52.74	17.15	12.29	18.91	6.15
Zr(28)-S	70.92	33.80	43.09	16.09	17.46	14.53	5.43
W(1020)-S	67.89	34.33	58.02	19.17	10.19	19.39	4.67
Ga(∞)-S	9.60	20.38	36.62	39.88	2.65	3.71	4.00
Nb(77)-S	37.99	23.32	32.54	46.56	6.05	7.99	11.44
Al(117)-Nb(20)-S	57.98	30.07	64.37	6.10	19.16	25.48	7.58
Al(17)-Zr(20)-S	83.71	28.41	47.30	15.86	16.49	13.64	4.58
Al(18)-W(817)-S	77.99	27.97	52.52	13.80	10.92	19.27	5.06
Al(17)-Ga(26)-S	76.04	28.74	52.75	17.77	11.24	16.98	5.72
H-ZSM-5	51.37	29.52	49.00	23.50	7.94	20.47	9.61

Reaction conditions: 250 °C, 0.15 g of catalyst, 0.3g of 2,5-DMF, 1,4-dioxane as solvent, at 1000 rpm during 5 h.

Figure S4: C balance from liquid, gas and solid phases obtained in the catalytic test of different metal-SBA-15 (A), and Al-Nb-SBA-15 (B) modified materials (CB-SP, CB-GP and CB-LP indicate the carbon present in solid, gas and liquid phases, respectively**.**



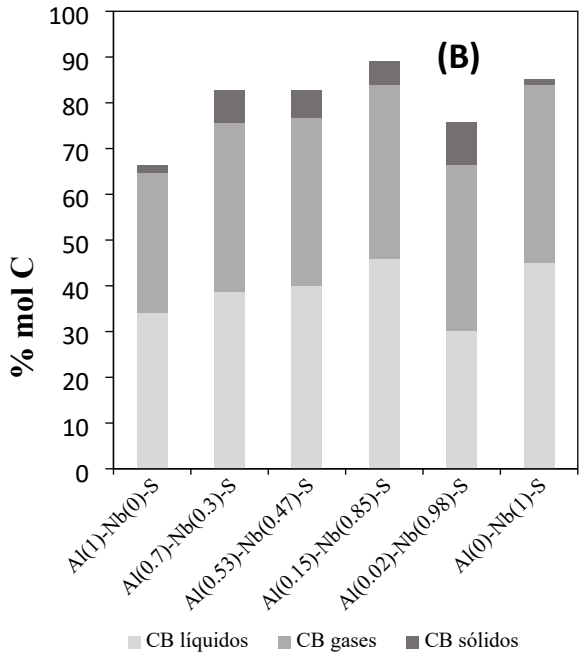


Figure S5. Catalyst performance by using 0.15 g of catalyst and 0.3g of 2,5-DMF (column A), respect to the half concentration of catalyst (column B) and to the half concentration of 2,5-DMF (column C), in terms of yield and selectivity to p-xy and hexanedione, 2,5-DMF conversion and Carbon % (deposited on used catalyst). Reaction conditions: 250 °C, 20 bar ethylene, magnetic stirring at 1000 rpm, 1,4-dioxane as solvent and 5 h of reaction time.

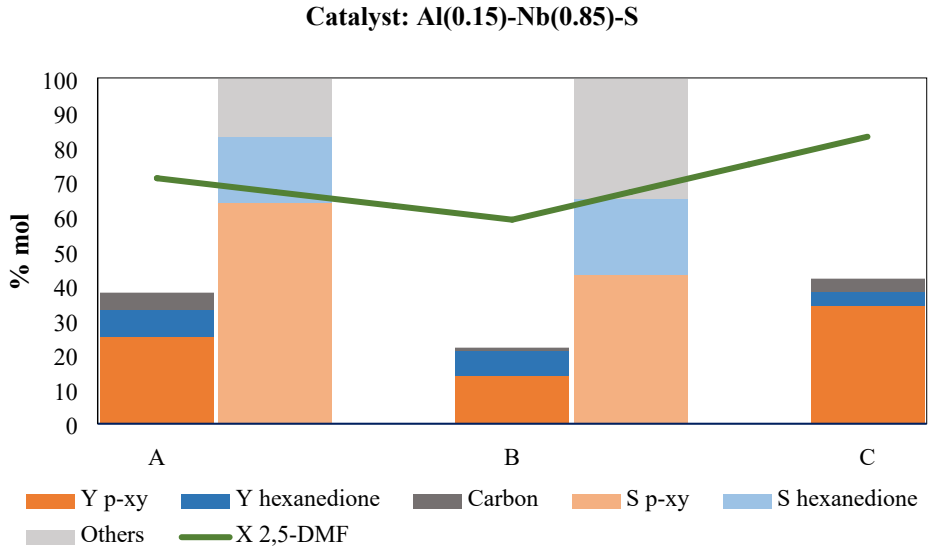


Figure S6. Catalyst performance with respect to reaction time in terms of yield and selectivity to p-xy and hexadione, 2,5-DMF conversion and Carbon % (deposited on used catalyst). Reaction conditions: 250 °C, 30 bar of ethylene, 0.15 g of catalyst, 0.15g of 2,5-DMF, 1,4-dioxane as solvent and magnetic stirring at 1000 rpm.

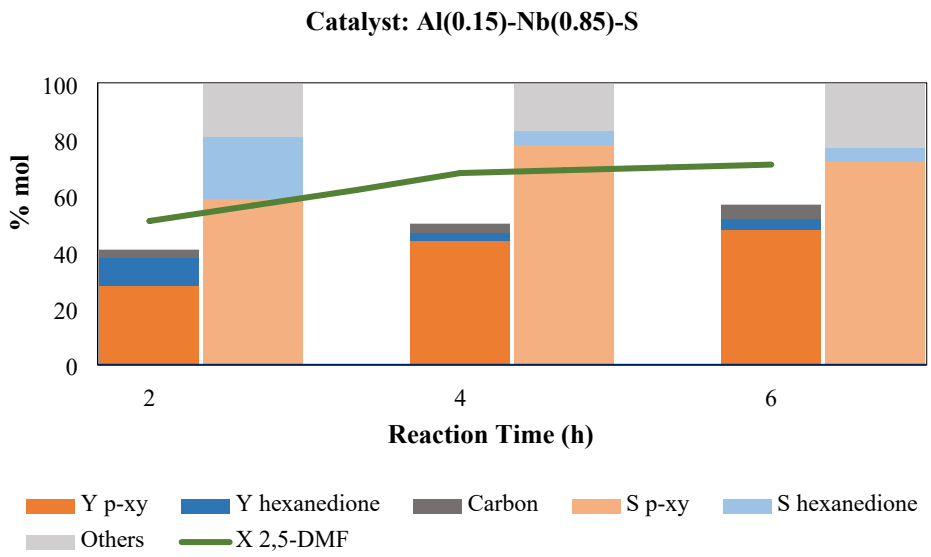
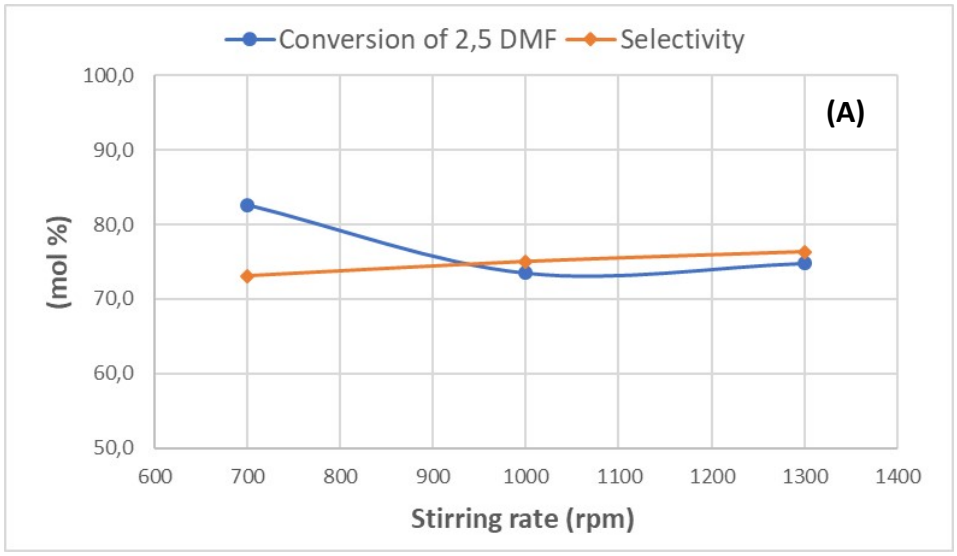


Figure S7. Catalytic tests at different stirring rates: (A) Conversion of 2,5-DMF (Mol.%) and selectivity to p-xylene (Mol.%); and (B) reaction rate calculated as mols converted per min. Reaction conditions: 250 °C, 30 bar of ethylene, 0.15 g of catalyst, 0.15g of 2,5-DMF, and 3 g of 1,4-dioxane as solvent during 6 h.



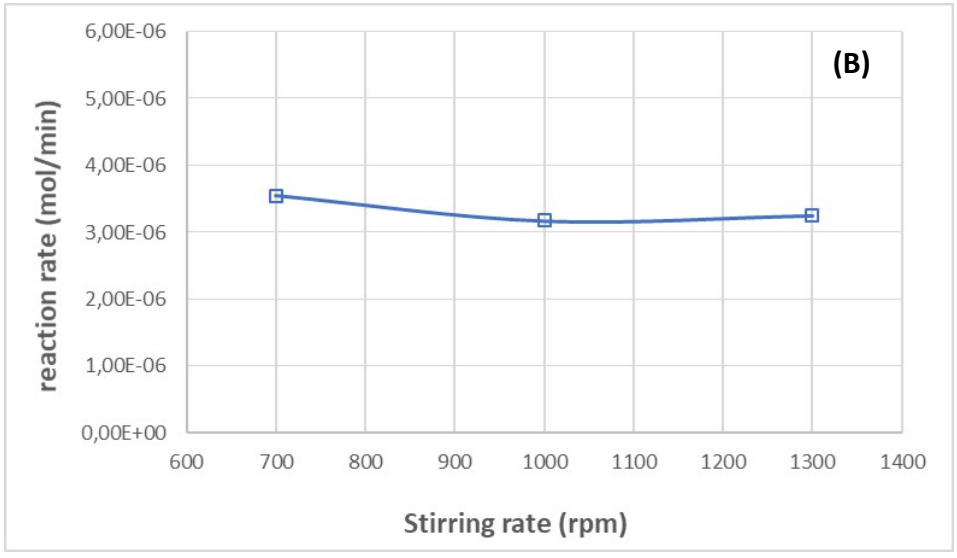


Figure S8. Catalytic tests with different particle diameters of catalyst: (A) Conversion of 2,5-DMF (Mol.%) and selectivity to p-xylene (Mol.%); and (B) reaction rate calculated as mols converted per min. Reaction conditions: 250 °C, 30 bar of ethylene, 0.15 g of catalyst, 0.15g of 2,5-DMF, and 3 g of 1,4-dioxane as solvent during 6 h.