Supplementary Materials

I- Determination of catalyst leaching deduced from the calcination of the fresh catalysts and solid residues.

Table S1: Fresh catalysts and solid residues* calcination at 1000°C under air in a muffle furnace: remaining weights on catalyst basis (wt%).

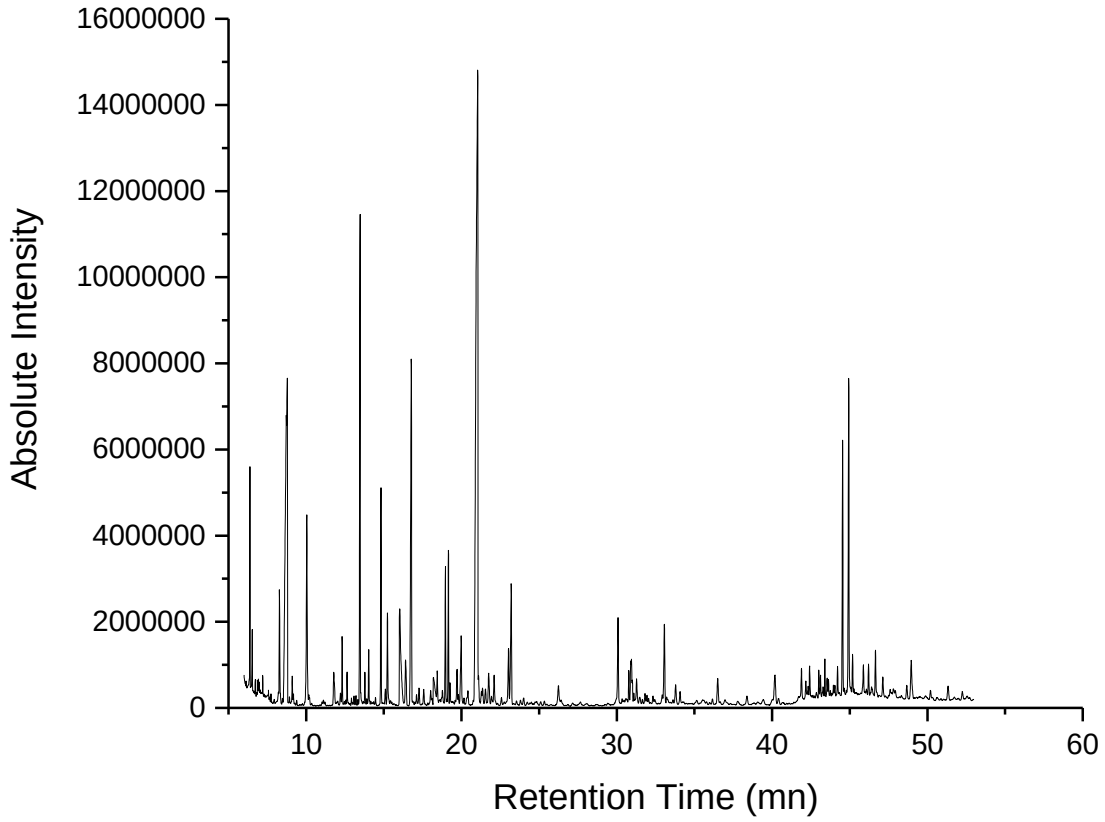
	$La_2O_3/ZrO2$	β zeolite	NbOH	CuZnAlO
Fresh catalyst	82.0 %	86.7 %	83.0 %	82.0 %
Solid residue**	20.3 %	35.5 %	6.5 %	3.2 %
Catalysts leaching (wt %)	75 %	59 %	92 %	96 %

* recovered by filtration at the end of the reaction, assumed to content the initial catalyst amount in absence of leaching

** % calculated as regards to the initial catalyst weight introduced in the reaction medium.

II- GC-MAS analysis and calibration

Graph S1: Typical GC chromatogram of the Light liquid products



Analysis Conditions: Equipment: Shimadzu GC-MS 2010. Column NUKol (0.25µm, 0.25mm, and 30m). Split ratio= 50, Gas vector=He, T injector =220°C, T mass source = 200°C respectively. T program: is 5 min at 70°C, 100°C, 120°C, 150°C, 200°C using a T ramp of 20°C.min^{-1} . Highest molecule mass ~200 g.mol^{-1}.

Table S2: Table of identified products corresponding to the chromatogram shown in graph S1

Peak	R.Time (min)	Area	Product	Probability
1*	6.377	6481250	Ethane, 1,2-diethoxy	96
2*	6.526	2500572,33	Butane, 1,1-diethoxy-	95
3*	8.276	8922328,33	Oxirane, (propoxymethyl)-	87
4	8.787	70233608,3	**Dodecane**	
5*	10.040	18285876,3	sec butyl ethyl ether	90
7	12.318	4011348,67	Acetic acid, ethoxy-, ethyl ester	95

9	13.472	31054088	Ethyl lactate	98
10	13.780	1981960	2-Cyclopenten-1-one	94
11	14.028	3371448	2-Cyclopenten-1-one, 2-methyl-	97
12	14.819	14052925,3	Butanoic acid, 2-hydroxy-, ethyl ester	94
13	15.234	6974739	Ethyl glycolate	95
14	16.023	16912179,7	Acetic acid	91
15	16.400	5502207	2-Furaldehyde diethyl acetal	93
16	16.769	36166494,3	Furfural	98
17	17.267	1508109,33	3-Pentanone	91
18	17.571	1350318,67	4-Heptanol	88
19		4154636	Formic acid	96
20	18.438	2468362,67	2-Cyclopenten-1-one, 3-methyl-	95
21	18.966	8573186,67	2-Cyclopenten-1-one, 2,3-dimethyl-	92
22	19.161	9399690,33	Butanoic acid, anhydride	94
24	19.713	2658112,67	3-Methyl-2-oxo-2H-pyrane-6-carboxylic	83
25	19.979	7267542	3,6-Heptanedione	87
26	21.043	129883935	Ethyl levulinate	94
28	22.102	2959207	4-Octanol, propanoate	82
29	23.031	9198757	Butanedioic acid, diethyl ester	82
30	23.203	12904459,7	Butanedioic acid, diethyl ester	82
32	30.079	8894979,67	1,2-Cyclopentanedione, 3-methyl-	97
34	30.947	6940908	o-guaiacol	95
37	33.788	2479868,33	p-methylguaiacol	87
38	36.499	3205682,33	4-ethylguiacol	97
39	40.181	4728144	p-propylguaiacol	93
41	42.414	2218588	Butanoic acid, 2-propenyl ester	90
42	43.004	1638159,67	Azelaic Acid	81
43	43.116	1373291,33	1-Hexanol, 2-ethyl-2-propyl-	76
44	43.394	2164093,67	5-Oxotetrahydrofuran-2-carboxylic acid	94
46	44.539	18747244	Isoeugenol	86
47	44.936	25756486,3	Acied lévulinique	97
49	45.875	2461627	Butanedioic acid, diethyl ester	90
50	46.206	2360277,67	2-Oxopentanedioic acid	83
51	46.656	4031828,33	p-propylguaiacol	83

*Product ascribed to ethanol conversion

Calibration and quantitative analysis:

Dodecane is used as internal standard.

Relative coefficients with respect to dodecane were determined for the mains products listed in table S3.

Table S3: Relative coefficients with respect to dodecane calibrated for the main products.

Ethyl formate	**Hydroxy acetone**	**Ethyl lactate**	**Furfural**	**Ethyl levulinate**	**Furfuryliquee alcohol**	**guaicol**	**isoeugenol**	**5-HMF**
1.9705	4.4452	1.4017 (esters, Ketones, Alcohols ethers)[1]	1.4343 (furans)[2]	1.0671	1.4907	1.2714 (phenolic compounds)[3]	1.7040	1.6579
Acetic acid	**Formic acid**							
3.6370 (acids)[4]	2.5240							

[1]: coefficient applied to the minor products gathered in the products' families named "ester", "ketone", "alcohol", "ether"

[2]: coefficient applied for the minor products gathered in the products' family named "furan"

[3]: coefficient applied for the minor products gathered in the products' family named "phenolic compounds"

[4]: coefficient applied for the minor products gathered in the products' family named "acids"

III- XRD patterns of synthesized catalysts

Figure S1: XRD Pattern of ZrO_2/La_2O_3

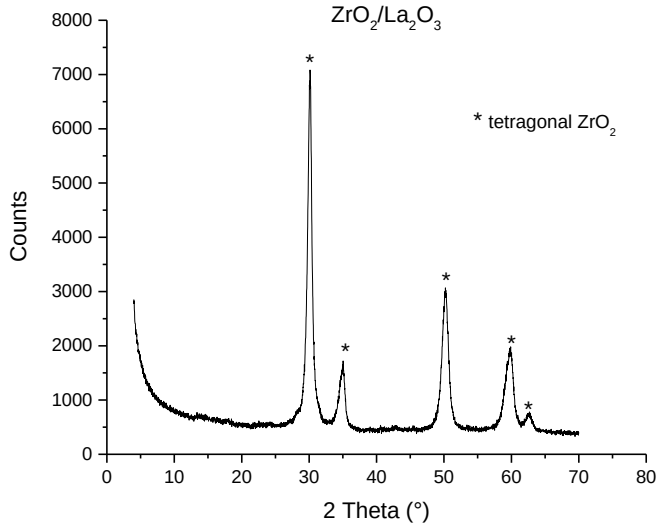


Figure S2: XRD pattern of CuZnAlO