

Supporting information.

Benefit of LDH-derived mixed oxides for the co-oxidation of toluene and CO exhausted from biomass combustion.

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Table S1. Metal composition of the mixed oxides catalysts

Catalyst	Element percentage % weight		
	Cu	Al	Ce
CuO-Al₂O₃-CeO₂	51	4	13
Cu₆Al₂	63	27	-
(Cu₆Al₂+CeO₂)₅₀₀	50	5	12
(Cu₆Al₂-HT+Ce(NO₃)₃)₅₀₀	50	5	12
Cu₆Al_{1.2}Ce_{0.8}	50	4	12

Table S2. Calculated H₂-TPR parameters of the prepared mixed oxides.

catalyst	Peak temperature (°C)			H ₂ consumption (μmol/g) (T < 350 °C)			
	T _α	T _β	T _γ	Experimentale	Peak α	Peak β	Peak γ
CuO	-	-	-	12332	-	-	12332
CuO-Al₂O₃-CeO₂	-	-	242	8247	n.d*	n.d*	n.d*
Cu₆Al₂	215	259	302	9026	181	5235	3610
(Cu₆Al₂+CeO₂)₅₀₀	230	259	304	7034	211	4783	2040
(Cu₆Al₂-HT+Ce(NO₃)₃)₅₀₀	184	250	266	7803	78	5462	2263
Cu₆Al_{1.2}Ce_{0.8}	168	206	239	8565	942	6081	1542

Table S3. Temperatures corresponding to the 10%, 50% and 90% conversion of simple toluene

Catalyst	T ₁₀ (°C)	T ₅₀ (°C)	T ₉₀ (°C)
CuO	270	314	348
CeO₂	227	277	313
CuO-Al₂O₃-CeO₂	236	302	360
Cu₆Al₂	275	298	350
(Cu₆Al₂+CeO₂)₅₀₀	235	292	358
(Cu₆Al₂-HT+Ce(NO₃)₃)₅₀₀	275	309	339
Cu₆Al_{1.2}Ce_{0.8}	233	254	277

oxidation.

Table S4. Temperatures corresponding to the 10%, 50% and 90% conversion of simple CO oxidation.

Catalyst	T ₁₀ (°C)	T ₅₀ (°C)	T ₉₀ (°C)
CuO	117	157	186
CeO₂	236	288	346
CuO-Al₂O₃-CeO₂	94	132	201
Cu₆Al₂	84	116	140
(Cu₆Al₂+CeO₂)₅₀₀	108	164	218
(Cu₆Al₂-HT+Ce(NO₃)₃)₅₀₀	71	128	167
Cu₆Al_{1.2}Ce_{0.8}	55	91	119

Table S5. Temperatures corresponding to the half conversion of toluene and CO in simple and mixture oxidation.

Catalyst	T ₅₀ (°C) (Toluene)		T ₅₀ (°C) (CO)	
	without CO	with CO	Without Toluene	With Toluene
CuO	314	325	157	247
CeO₂	277	290	284	325
CuO-Al₂O₃-CeO₂	302	302	132	-
Cu₆Al₂	298	298	116	277
(Cu₆Al₂+CeO₂)₅₀₀	292	289	164	262
(Cu₆Al₂-HT+Ce(NO₃)₃)₅₀₀	309	305	128	236
Cu₆Al_{1.2}Ce_{0.8}	254	252	91	86

Table S6. Temperature corresponding to the half conversion of toluene and CO in simple and mixture oxidation over $\text{Cu}_6\text{Al}_{2-x}\text{Ce}_x$ ($x=0-0.8$) catalysts.

Catalyst	T ₅₀ (°C) (Toluene)		T ₅₀ (°C) (CO)	
	Without CO	with CO	without Toluene	With Toluene
Cu₆Al₂	298	298	116	277
Cu₆Al_{1.8}Ce_{0.2}	289	289	147	202
Cu₆Al_{1.6}Ce_{0.4}	288	288	130	152
Cu₆Al_{1.4}Ce_{0.6}	254	252	101	92
Cu₆Al_{1.2}Ce_{0.8}	254	252	91	86

Table S7. Calculated structural and textural parameters of $\text{Cu}_6\text{Al}_{2-x}\text{Ce}_x$ catalysts series.

Characterization	Textural analysis			H ₂ -TPR analysis					
Parameters	BET surface (m ² /g)	Pores volume (cm ³ /g)	Pore diameter (nm)	T (α)	T (β)	T (γ)	Pic (α) H ₂ uptakes mmol	Pic (β) H ₂ uptakes mmol	Pic (γ) H ₂ uptakes mmol
Cu₆Al₂	17	0.14	35.41	215	259	302	181	5235	3610
Cu₆Al_{1.8}Ce_{0.2}	33	0.19	23.87	210	230	277	263	1666	6838
Cu₆Al_{1.6}Ce_{0.4}	43	0.21	23.04	184	218	254	363	4269	4450
Cu₆Al_{1.4}Ce_{0.6}	51	0.24	18.40	172	206	232	844	6248	1351
Cu₆Al_{1.2}Ce_{0.8}	47	0.19	17.40	168	206	239	942	6081	1542

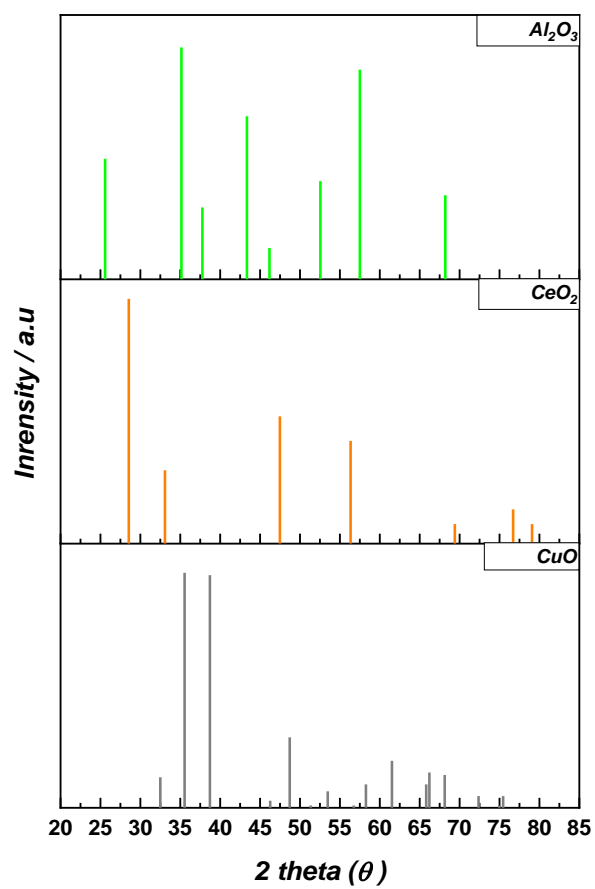


Figure S1. JPCDS cards of the obtained phases for the prepared mixed oxides.

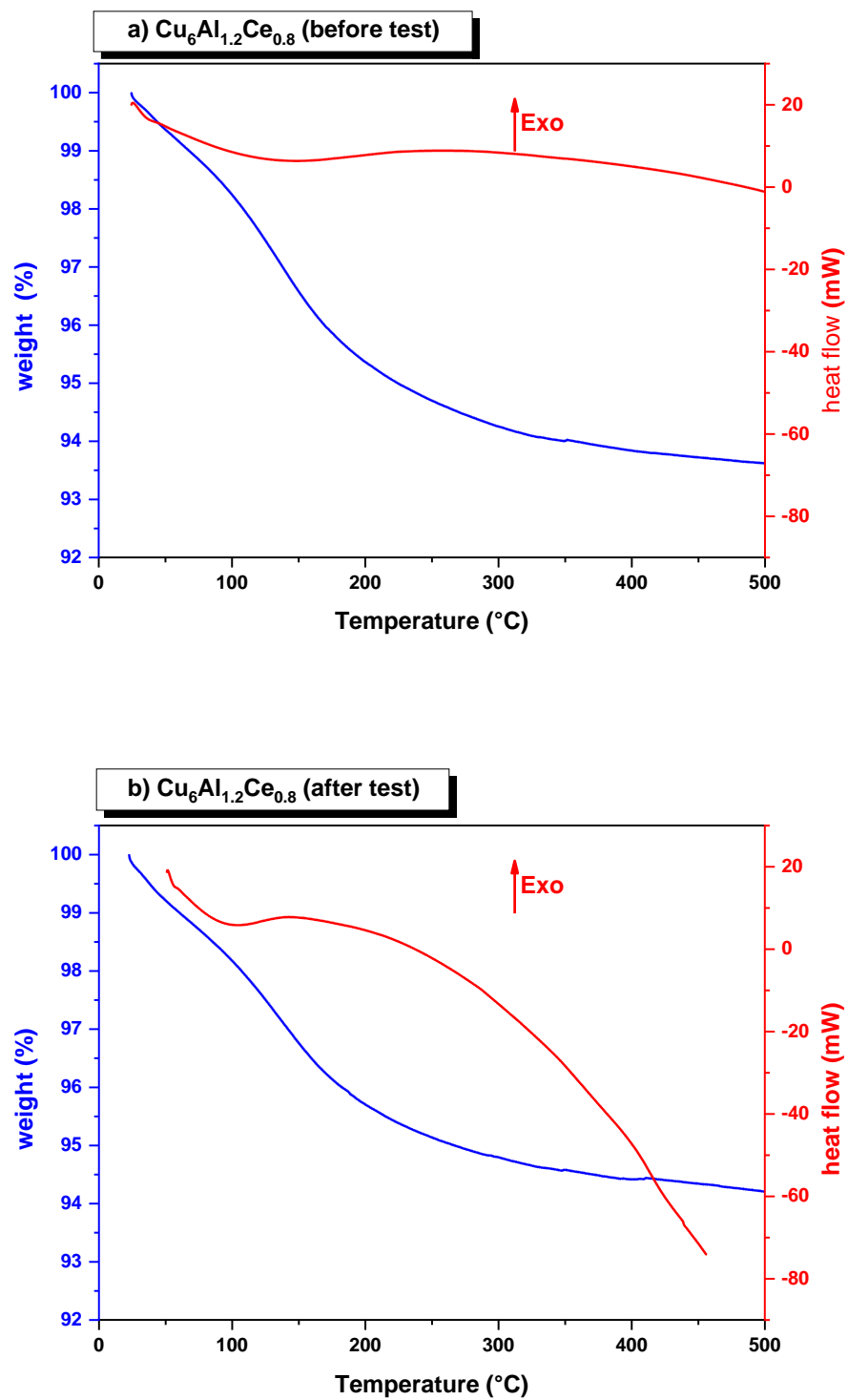


Figure S2. TGA-DSC of the raw and reused $\text{Cu}_6\text{Al}_{1.2}\text{Ce}_{0.8}$ catalyst.