Supporting Information

Enhanced catalytic oxidation ability of ternary layered double hydroxides for organic pollutants degradation

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	Mg_4Al_2	Cu_4Al_2	Co_4Al_2	$Mg_3Cu_1Al_2$	$Mg_2Cu_2Al_2$
S_{BET} ($mg^2\ g^{-1}$)	55	22	36	57	60
Vp ($cm^3\ g^{-1}$)	0.26	0.07	0.18	0.15	0.14
	$Mg_3Co_1Al_2$	$Mg_2Co_2Al_2$	$Co_3Cu_1Al_2$	$Co_2Cu_2Al_2$	$Co_1Cu_3Al_2$
S_{BET} ($mg^2\ g^{-1}$)	50	43	50	52	22
Vp ($cm^3\ g^{-1}$)	0.18	0.18	0.20	0.20	0.18

Table S1. The specific surface (S_{BET}) and pore volume (Vp) of LDH materials.

	Mg_4Al_2	Cu_4Al_2	Co_4Al_2	$Mg_3Cu_1Al_2$	$Mg_2Cu_2Al_2$
Zeta potential (mV)	39.4	34.9	28.3	38.2	35.2
	$Mg_3Co_1Al_2$	$Mg_2Co_2Al_2$	$Co_3Cu_1Al_2$	$Co_2Cu_2Al_2$	$Co_1Cu_3Al_2$
Zeta potential (mV)	37.5	35.9	31.9	32.3	33.8

Table S2. Zeta potential value of LDH materials.

OII	Mg_4Al_2	Cu_4Al_2	Co_4Al_2	$Mg_3Cu_1Al_2$	$Mg_2Cu_2Al_2$
q_e (mg/g)	53.6	72.5	34.4	59.9	56.5
k_1 (min^{-1})	0.0308	0.0173	0.0142	0.0329	0.0331
R^2	0.9893	0.9981	0.9797	0.9587	0.9430
	$Mg_3Co_1Al_2$	$Mg_2Co_2Al_2$	$Co_3Cu_1Al_2$	$Co_2Cu_2Al_2$	$Co_1Cu_3Al_2$
q_e (mg/g)	63.0	50.9	25.9	30.4	30.7
k_1 (min^{-1})	0.0273	0.0321	0.0109	0.0144	0.0172
R^2	0.9732	0.9884	0.9759	0.9657	0.9704

Table S3. Kinetic parameters for adsorption of OII, obtained using the pseudo-first order model. $C_{initial}$ = 300 mg / L.

	Mg_4Al_2	Cu_4Al_2	Co_4Al_2	$Mg_3Cu_1Al_2$	$Mg_2Cu_2Al_2$
n	7.7	10.1	7.0	5.0	9.3
K_F $(mg/g)/(L/mg)^{1/n}$	63.1	63.0	26.5	33.7	66.1
R^2	0.6473	0.7607	0.7143	0.7620	0.4468

	$Mg_3Co_1Al_2$	$Mg_2Co_2Al_2$	$Co_3Cu_1Al_2$	$Co_2Cu_2Al_2$	$Co_1Cu_3Al_2$
n	11.5	9.1	11.4	13.8	17.5
K_F $(mg/g)/(L/mg)^{1/n}$	67.3	54.9	46.1	53.5	61.8
R^2	0.8760	0.5030	0.9605	0.7680	0.8922

Table S4. Fitting parameters obtained using the Freundlcih isotherms model, n stands for the heterogeneity factor, K_F for the Freundlich constant and R^2 for squared correlation coefficient.

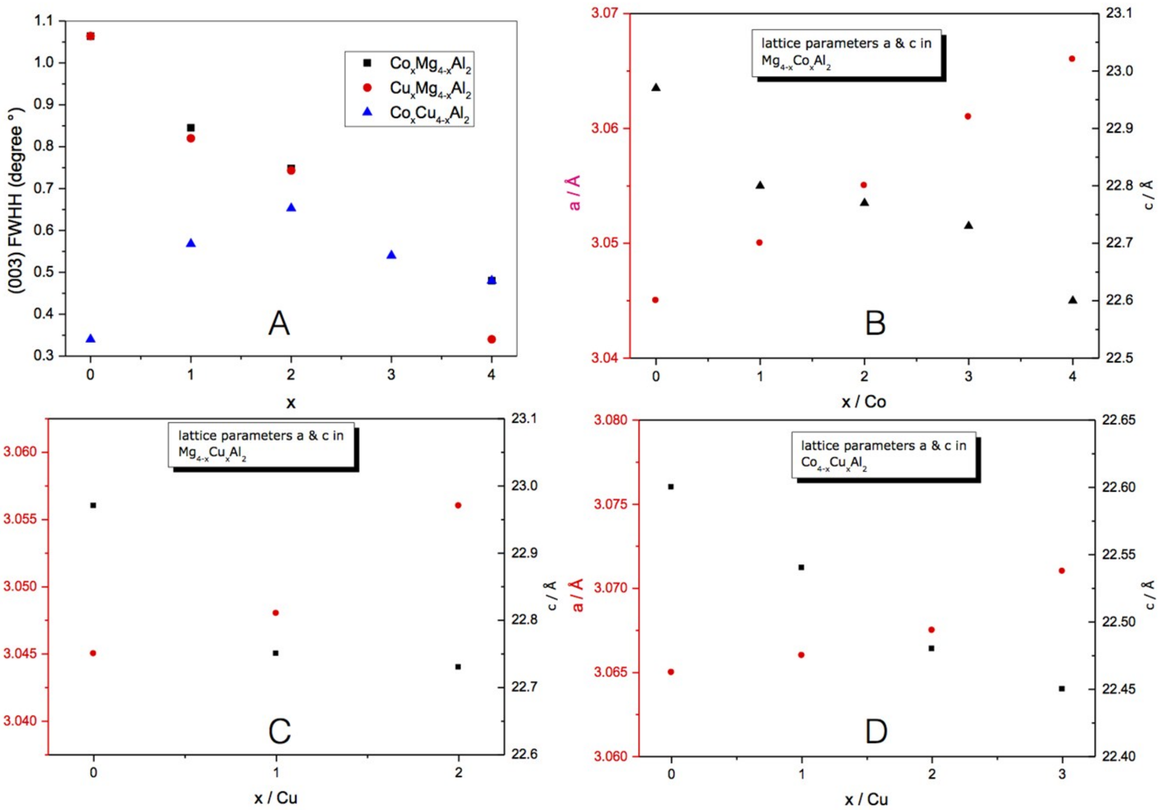
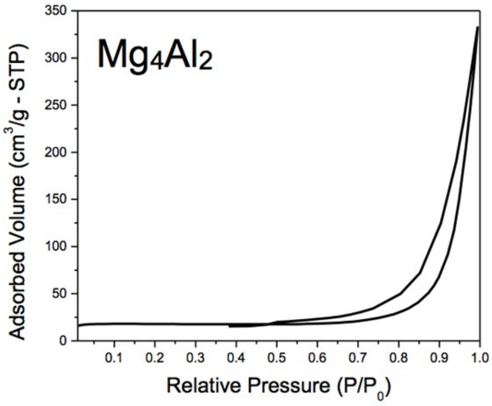
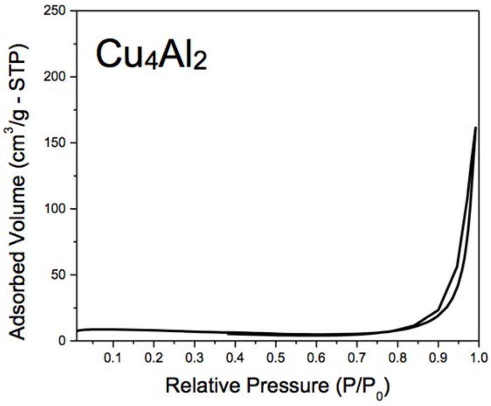


Fig. S1. Extracted data from XRD diffractograms: A) Evolution of Full Width at Half Height of the (003) reflection as function of the metal substitution; Evolution of lattice parameters a, c for B) MgCoAl, C) MgCuAl and D) CoCuAl.


Mg4Al2
Adsorbed Volume (cm3/g - STP)
0 50 100 150 200 250 300 350
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Relative Pressure (P/P0)


Cu4Al2
Adsorbed Volume (cm3/g - STP)
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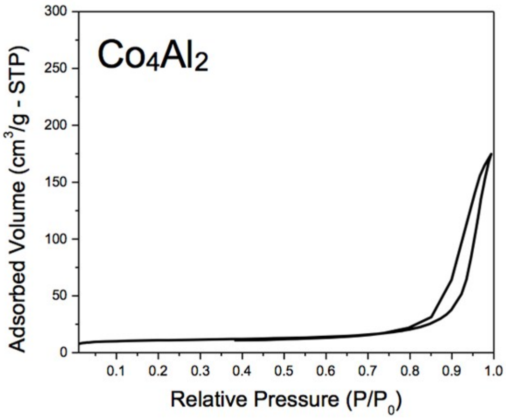
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Relative Pressure (P/P0)


Co4Al2
Adsorbed Volume (cm3/g - STP)
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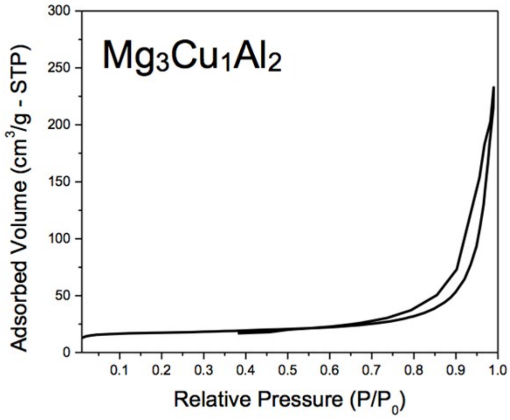
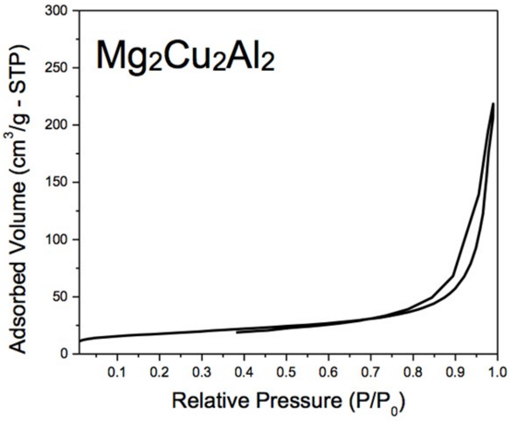
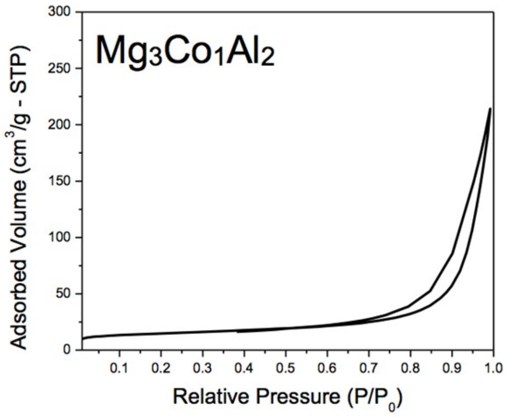
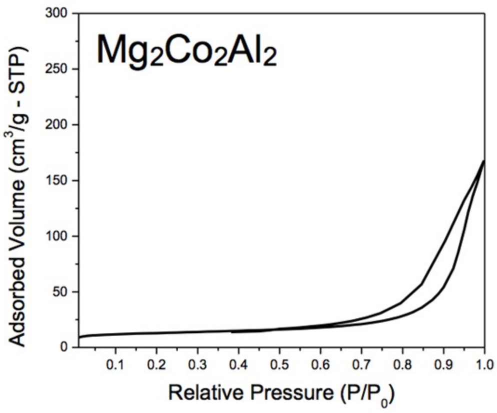
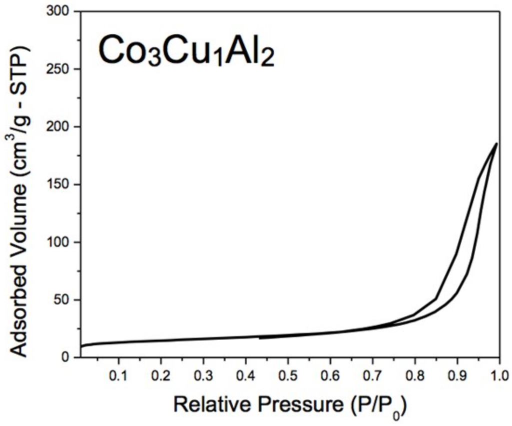
Relative Pressure (P/P0)


Mg3Cu1Al2
Adsorbed Volume (cm3/g - STP)
0 50 100 150 200 250 300
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Relative Pressure (P/P0)


Mg2Cu2Al2
Adsorbed Volume (cm3/g - STP)
0 50 100 150 200 250 300
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Relative Pressure (P/P0)


Mg3Co1Al2
Adsorbed Volume (cm3/g - STP)
0 50 100 150 200 250 300
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Relative Pressure (P/P0)


Mg2Co2Al2
Adsorbed Volume (cm3/g - STP)
0 50 100 150 200 250 300
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Relative Pressure (P/P0)


Co3Cu1Al2
Adsorbed Volume (cm3/g - STP)
0 50 100 150 200 250 300
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Relative Pressure (P/P0)

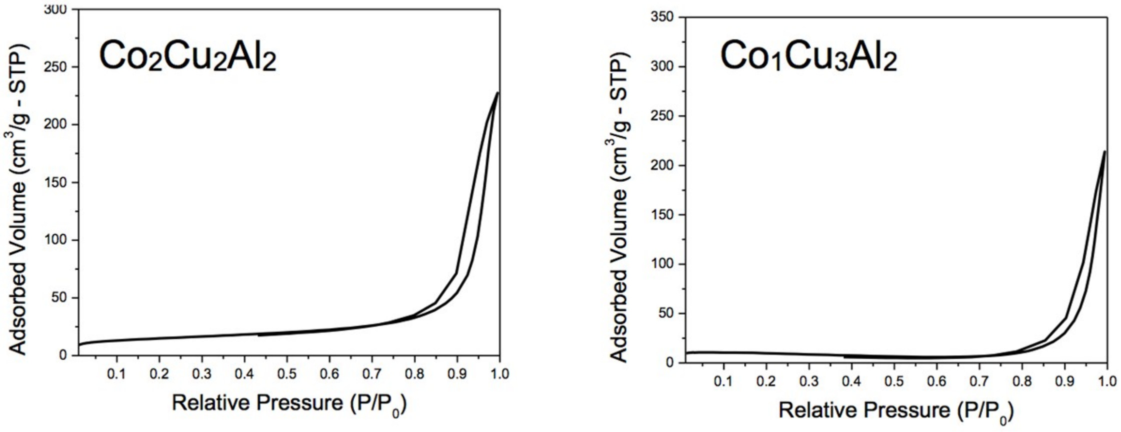


Fig. S2. N_2 adsorption-desorption isotherms of LDH materials

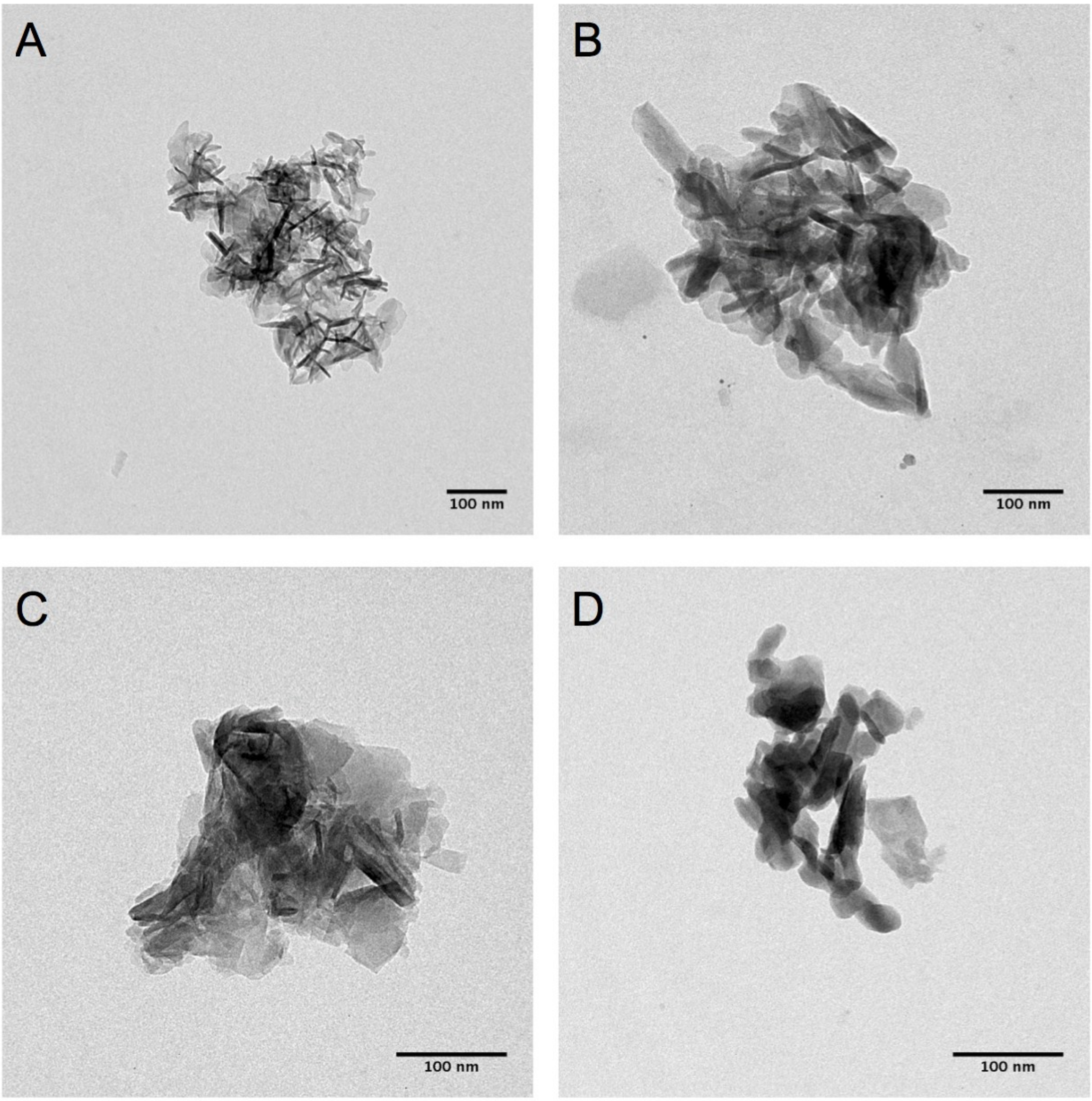


Fig. S3. TEM image of A) Mg_4Al_2, B) $Mg_2Cu_2Al_2$, C) $Mg_2Co_2Al_2$, D) $Co_2Cu_2Al_2$

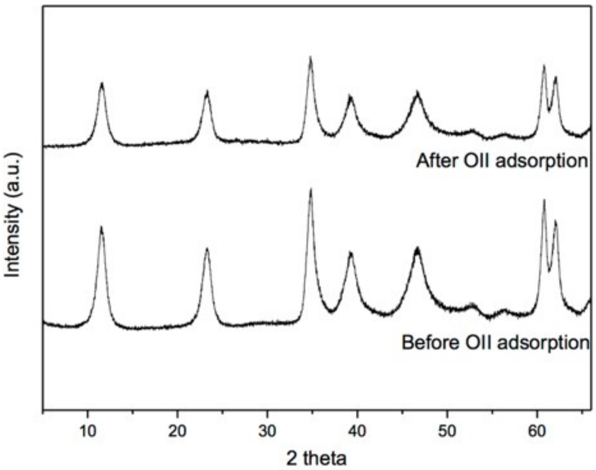


Fig. S4. XRD of Mg_4Al_2 before / after OII adsorption.

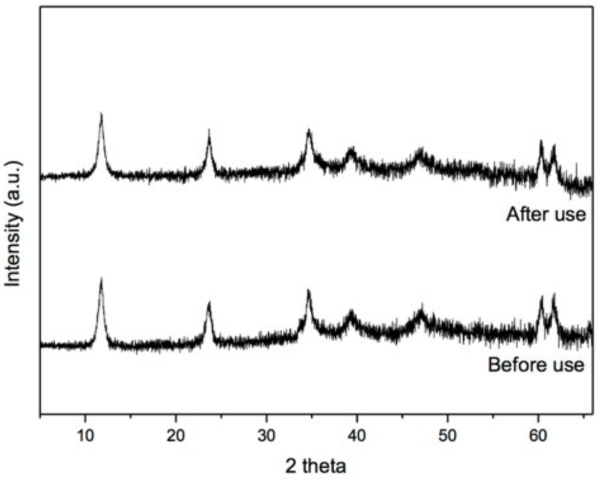


Fig. S5. XRD of $Co_3Cu_1Al_2$ before / after orange II degradation.

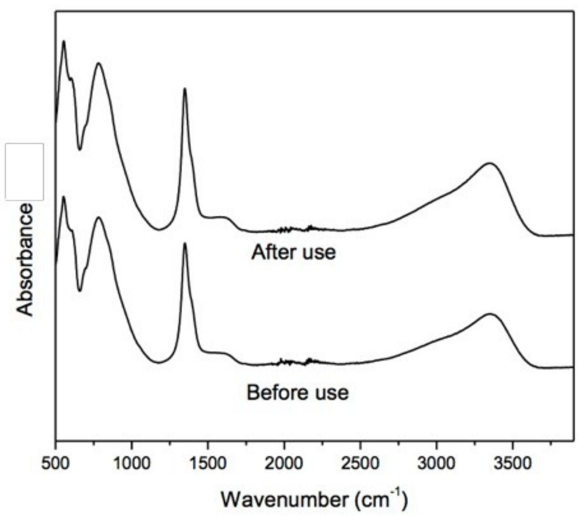


Fig. S6. FT-IR spectra of $Co_3Cu_1Al_2$ before / after orange II degradation.