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Electronic Supplementary Information (ESI)

Cobalt-based Layered Double Hydroxides Revisited: evidence for an oxidizing radical generation

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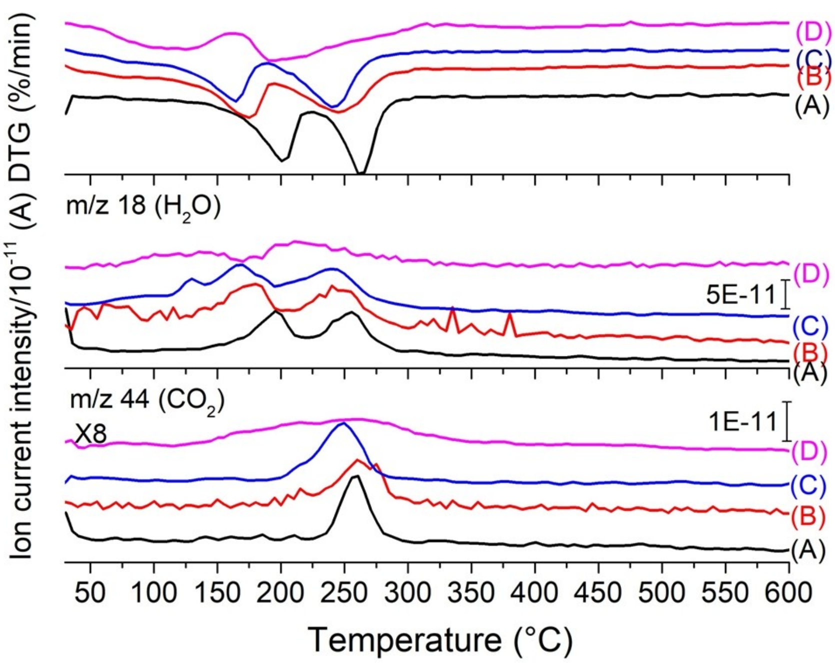

Fig. 1S DTG (superior) and MS (inferior) curves of Co_RAl-CO_3 materials: (A) Co_2Al-CO_3, (B) Co_3Al-CO_3, (C) Co_4Al-CO_3, and (D) Co_5Al-CO_3.

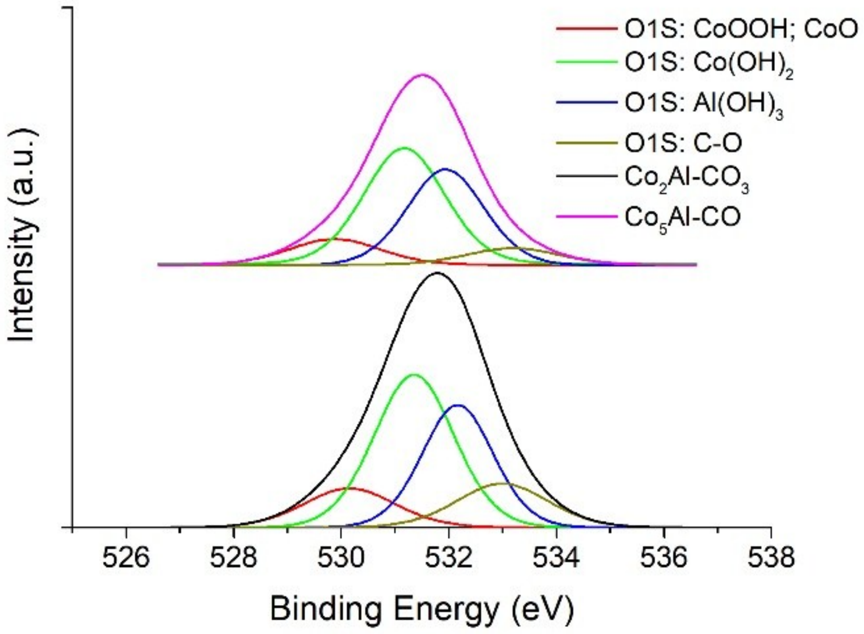

Fig. 2S High-resolution XPS O1S of $Co_2Al\text{-}CO_3$ and $Co_5Al\text{-}CO_3$ materials.

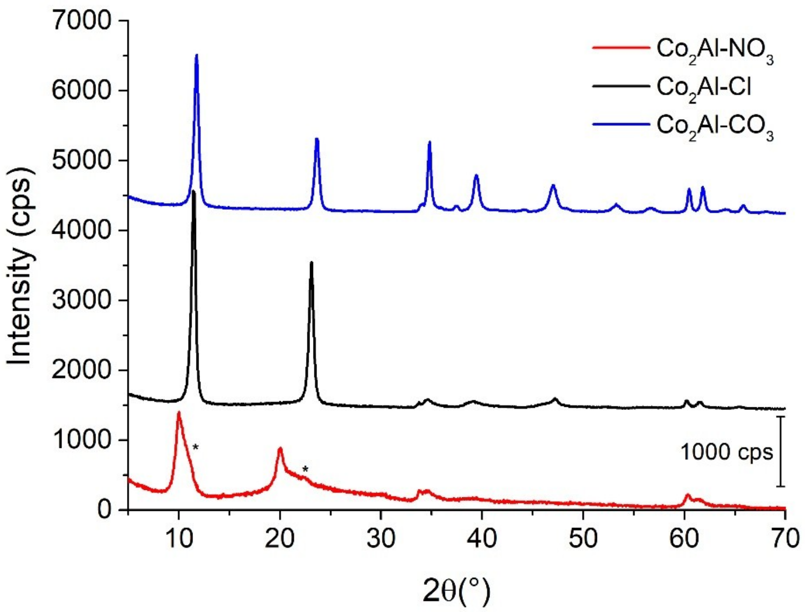

Fig. 3S XRD patterns of cobalt-based LDH. (*) carbonate phase.

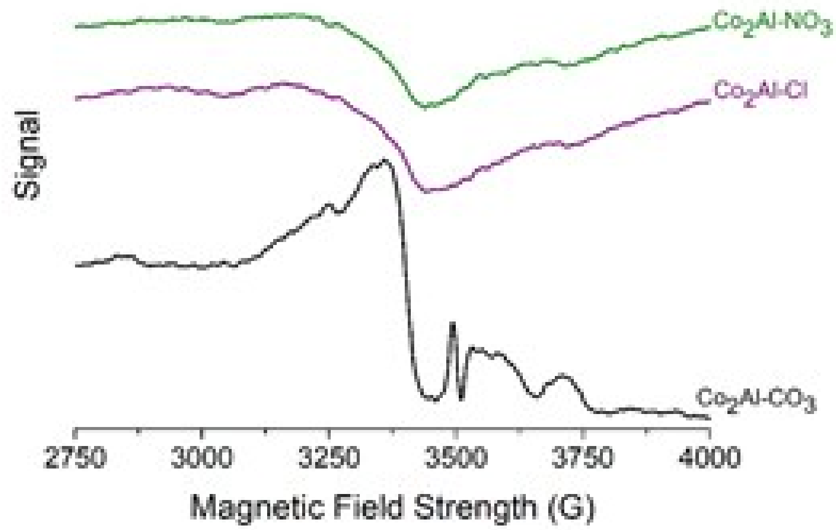

Fig. 4S EPR spectra of Co_2Al-CO_3 (black line), Co_2Al-Cl (purple line) and Co_2Al-NO_3 (green line).

Table 1S Metal analysis (ICP OES) of nitrate and chloride cobalt-based LDH materials.

LDH samples	Molar ratio (Co/Al)
Co_2Al-NO_3	2.10 ± 0.00
Co_2Al-Cl	2.21 ± 0.02

Table 2S Reduction potential for some oxygen, carbon and cobalt species.

Reaction condition	**Reaction**	**Potential (V x SHE)**	**Ref.**
pH = 0	$O_2 + 4H^+ + 4e^- \rightarrow 2H_2O$	1.229	1
	$O_2 + H^+ + e^- \rightarrow HO_2^-$	-0.105	1
	$^{\bullet}OH + H^+ + e^- \rightarrow H_2O$	2.85	1
	$O_2 + 2H^+ + 2e^- \rightarrow H_2O_2$	0.695	1
	$H_2O_2 + 2H^+ + 2e^- \rightarrow 2H_2O$	1.776	1
	$H_2O_2 + H^+ + e^- \rightarrow H_2O + {}^{\bullet}OH$	0.71	1
	$Co^{3+} + e^- \rightarrow Co^{2+}$	1.92	1
pH = 7	$O_2 + 4H^+ + 4e^- \rightarrow 2H_2O$	0.815	2
	$O_2 + e^- \rightarrow O_2^{-\bullet}$	-0.16	2
	$O_2^{-\bullet} + 2H^+ + e^- \rightarrow H_2O_2$	0.89	2
	$O_2 + 2H^+ + 2e^- \rightarrow H_2O_2$	0.28	2
	$H_2O_2 + H^+ + e^- \rightarrow H_2O + {}^{\bullet}OH$	0.38	2
	$^{\bullet}OH + H^+ + e^- \rightarrow H_2O$	2.32	2
	$H_2O_2 + 2e^- \rightarrow 2OH^-$	1.349	2
	$CO_3^{-\bullet} + e^- \rightarrow CO_3^{2-}$	1.57	3
pH = 14	$O_2 + 2H_2O + 4e^- \rightarrow 4OH^-$	0.401	1
	$O_2 + e^- \rightarrow O_2^{-\bullet}$	-0.563	1
	$O_2 + H_2O + 2e^- \rightarrow HO_2^- + OH^-$	-0.076	1
	$HO_2^- + H_2O + e^- \rightarrow {}^{\bullet}OH + 2OH^-$	-0.245	1
	$HO_2^- + H_2O + 2e^- \rightarrow 3OH^-$	0.878	1
	$^{\bullet}OH + e^- \rightarrow OH^-$	2.02	1
	$Co(OH)_3 + e^- \rightarrow Co(OH)_2 + OH^-$	0.17	1

References

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