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Layered Double Hydroxides-Based Mixed Metal Oxides

Citation for published version:

Gudiyor Veerabhadrapa, M, Maroto-Valer, MM, Chen, Y & Garcia, S 2021, 'Layered Double Hydroxides-Based Mixed Metal Oxides: Development of Novel Structured Sorbents for CO₂ Capture Applications', *ACS Applied Materials and Interfaces*, vol. 13, no. 10, pp. 11805–11813. <https://doi.org/10.1021/acsami.0c20457>

Digital Object Identifier (DOI):

[10.1021/acsami.0c20457](https://doi.org/10.1021/acsami.0c20457)

Link:

[Link to publication record in Heriot-Watt Research Portal](#)

Document Version:

Peer reviewed version

Published In:

ACS Applied Materials and Interfaces

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Supporting Information

Layered Double Hydroxides (LDHs) based Mixed Metal Oxides (MMOs): Development of Novel Structured Sorbents for CO₂ Capture Applications

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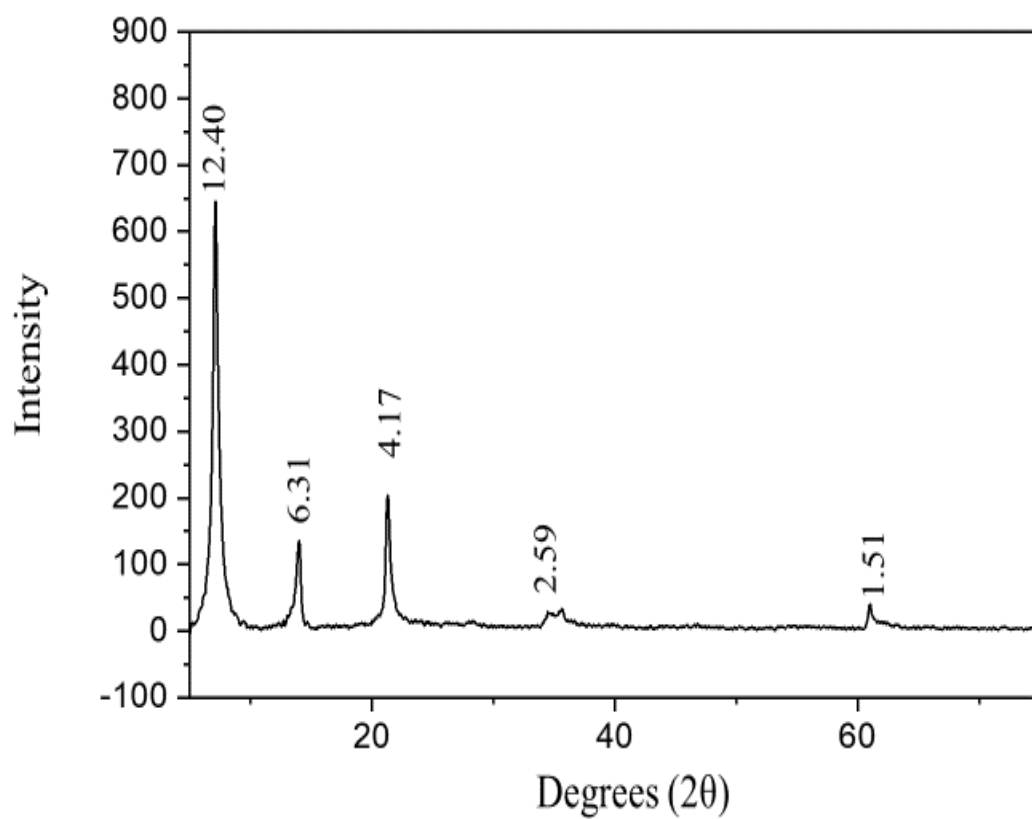


Figure S1. PXRD pattern of Mg-Al-acetate LDH (Mg/Al =4) prepared by employing metal hydroxides. Values given on reflections are corresponds to d -spacing in Å.

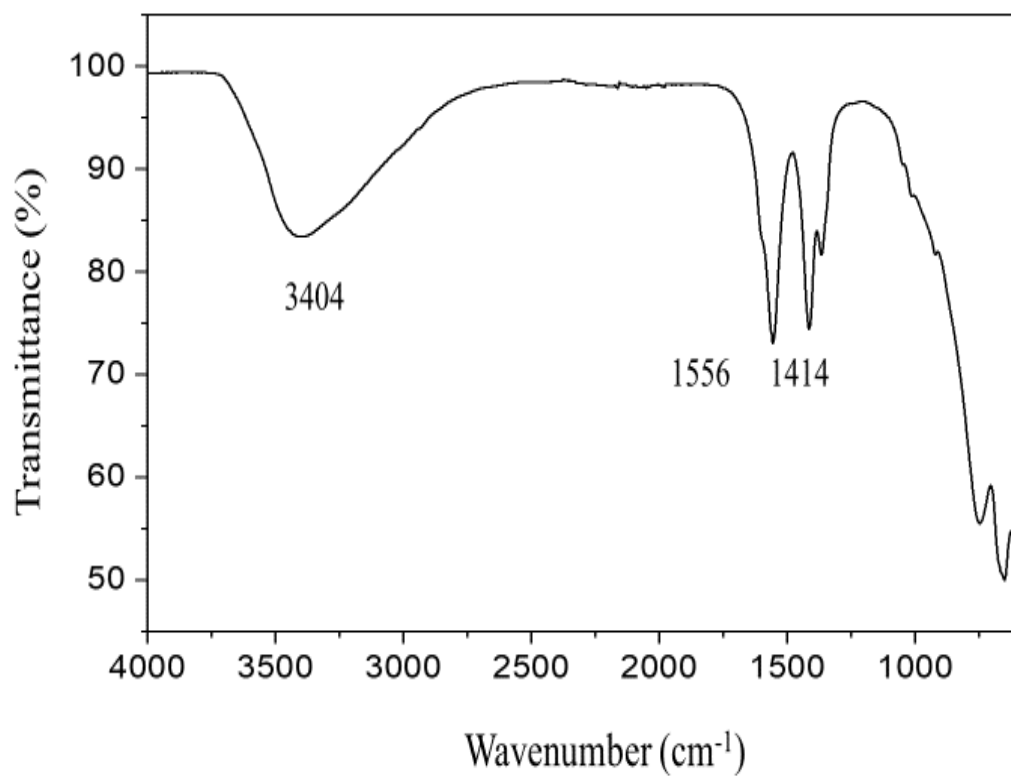


Figure S2. FTIR spectrum of Mg-Al-acetate LDH (Mg/Al =4) prepared by employing metal hydroxides.

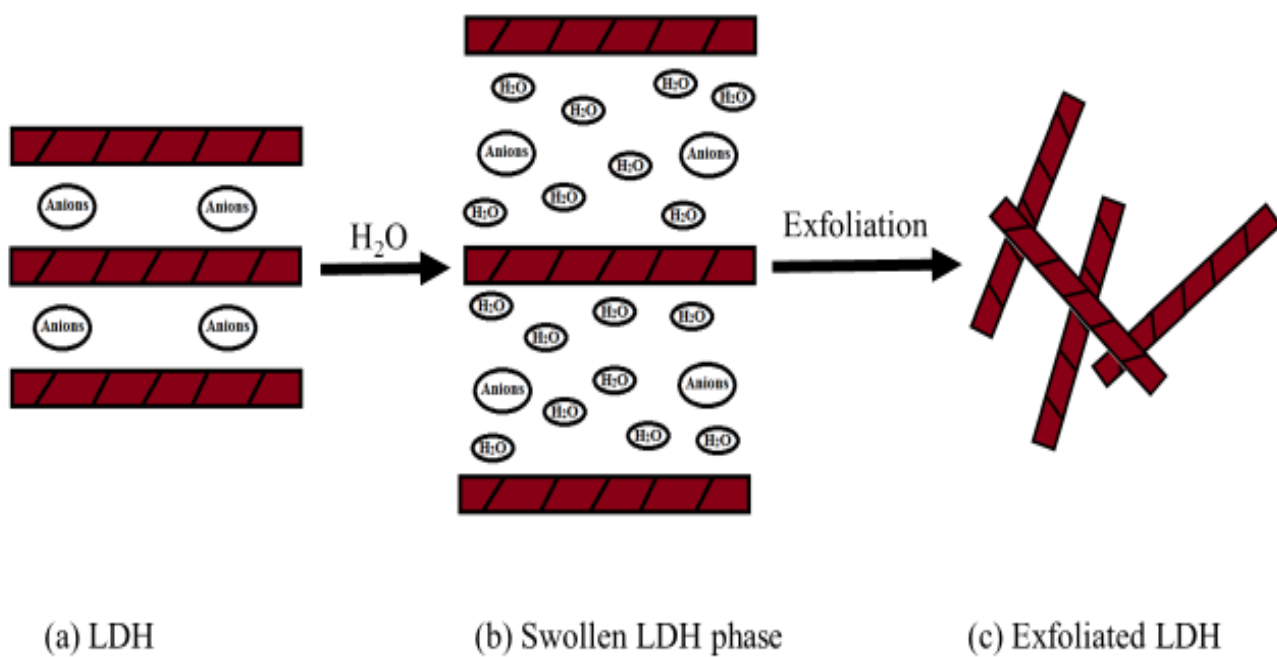


Figure S3. Schematic of aqueous exfoliation of acetate intercalated Mg-Al LDH.

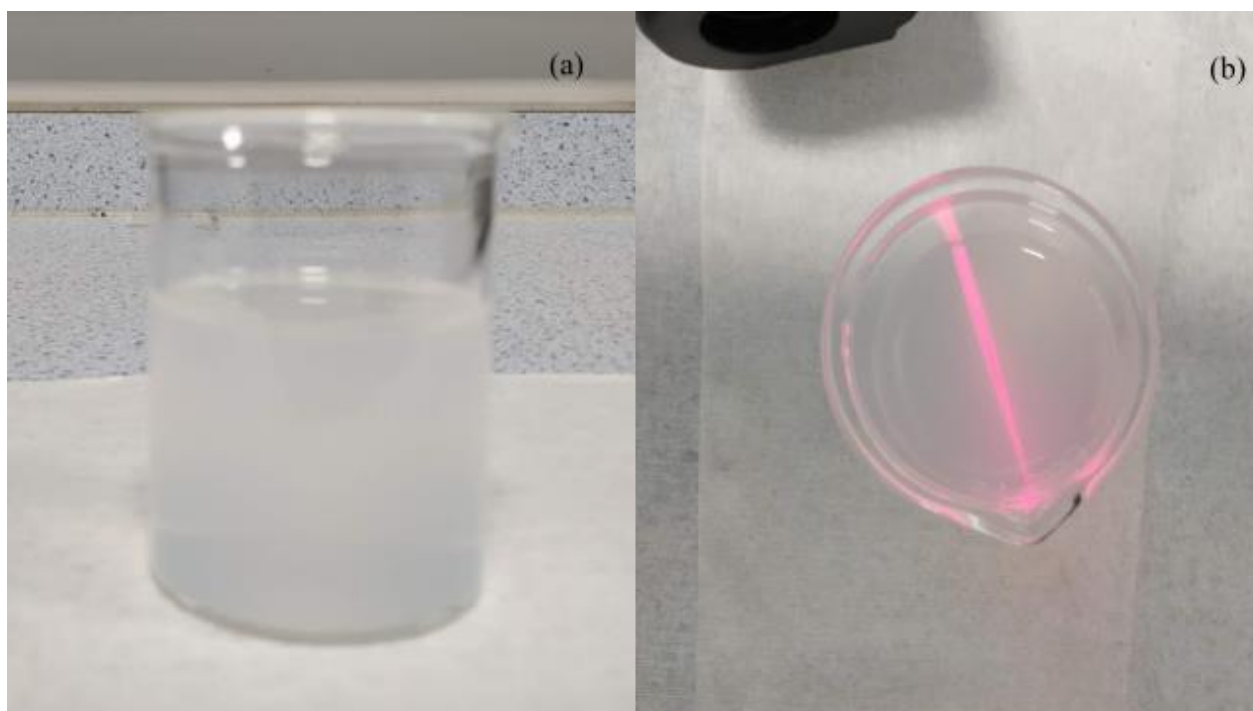


Figure S4. Photographic images of exfoliated colloidal suspension of Mg-Al-acetate LDH (a) without and (b) with Tyndall effect.

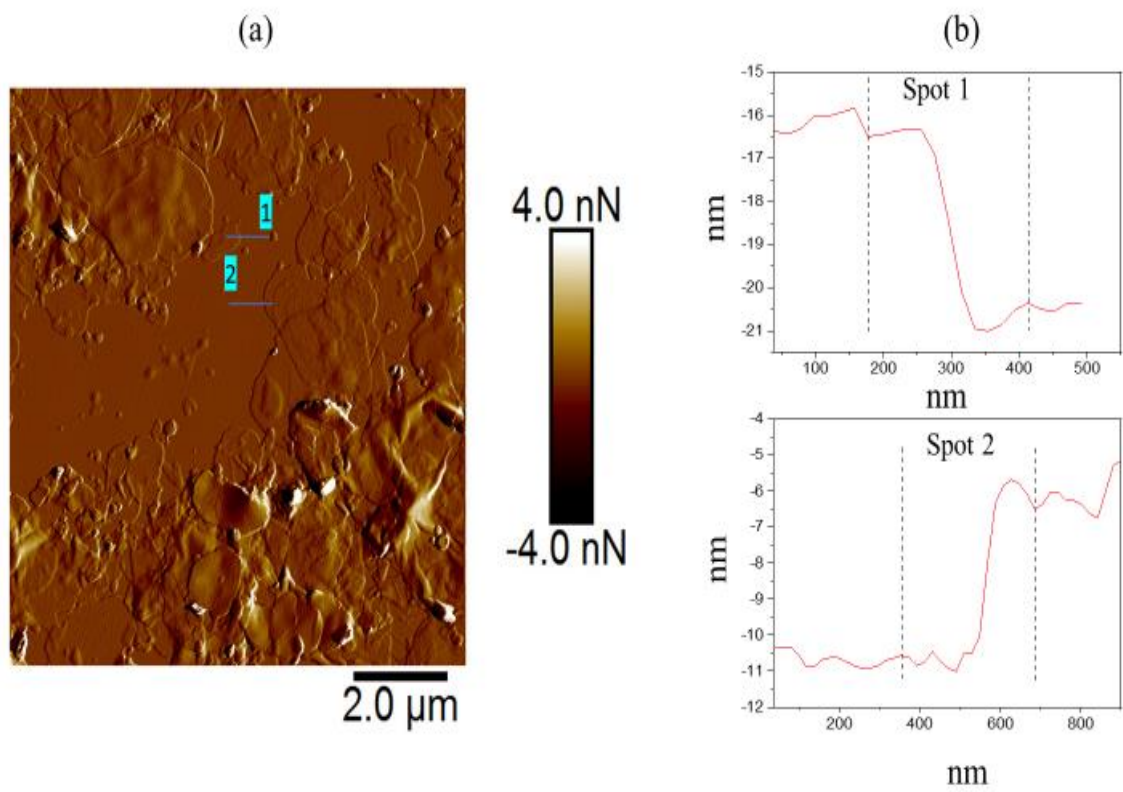


Figure S5. (a) AFM topographical image of the colloidal suspension of Mg-Al-acetate LDH and (b) height profiles of spot 1 and spot 2 marked in (a). The height profiles in (b) are measured along the horizontal lines marked in (a).



Figure S6. Photographic image of pellets (2 mm) generated from the exfoliated freeze-dried Mg-Al-acetate LDH (Mg/Al =4).

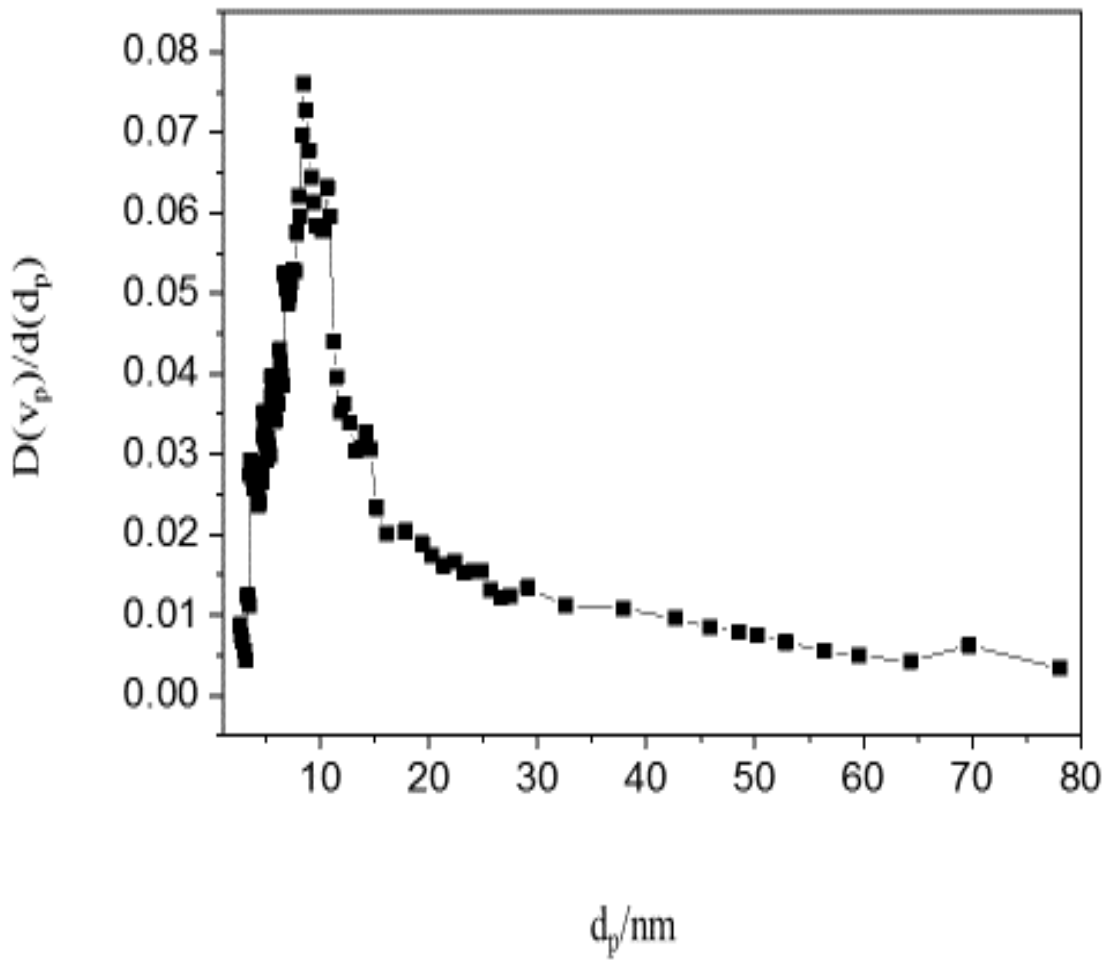


Figure S7. BJH plot of MMOs pellets obtained from exfoliated freeze-dried Mg-Al-acetate LDH (Mg/Al =4).

Table S1. Comparison of CO₂ capture performance for pristine MMOs sorbents.

Composition	Sample form	Measurement Method	Capture Temperature (°C) & CO ₂ concentration (%)	CO ₂ capture capacity (mmol/g)	Reference
Mg-Al-CO ₃	powder	TGA	200, 100%	0.80	1
Mg-Al-CO ₃	powder	TGA	200, 50 %	0.90	2
Mg-Al-Pl	powder	TGA	200, 100 %	0.91	3
Mg-Al-CO ₃	powder	TGA	240, 100 %	0.83	4
Mg-Al-St	powder	TGA	300, 100 %	1.01	5
Mg-Al-St	Powder	TGA	200, 100 %	1.15	6
Mg-Al-St	Powder	TGA	300, 100 %	1.25	6
Mg-Al-CO ₃	powder	TGA	200, 100%	0.83	7
Mg-Al-CO ₃	powder	TGA	200, 100%	0.74	8
Mg-Al-CO ₃	powder	TGA	300, 100%	0.62	9
Mg-Al-Ac	Powder	TGA	200, 100 %	0.51	3
Mg-Al-CO ₃	Pellets*	TGA	200, 50 %	0.14	10
Mg-Al-CO ₃	Pellets*	TGA	300, 100%	0.23	11
Mg-Al-Ac	Pellets	TGA	30, 86 %	2.17	This work
Mg-Al-Ac	Pellets	TGA	200, 86 %	1.43	This work
Mg-Al-Ac	Pellets	TGA	250, 86 %	1.02	This work
Mg-Al-Ac	Pellets	TGA	300, 86 %	0.79	This work
Mg-Al-Ac	Pellets	TGA	30, 14 %	1.75	This work
Mg-Al-Ac	Pellets	TGA	200, 14 %	1.20	This work

CO₃= Carbonate, Pl= Palmitate, St= Stearate, Ac= Acetate, TGA= Thermo gravimetric analysis.

* Binders and extrusion agents are used.

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