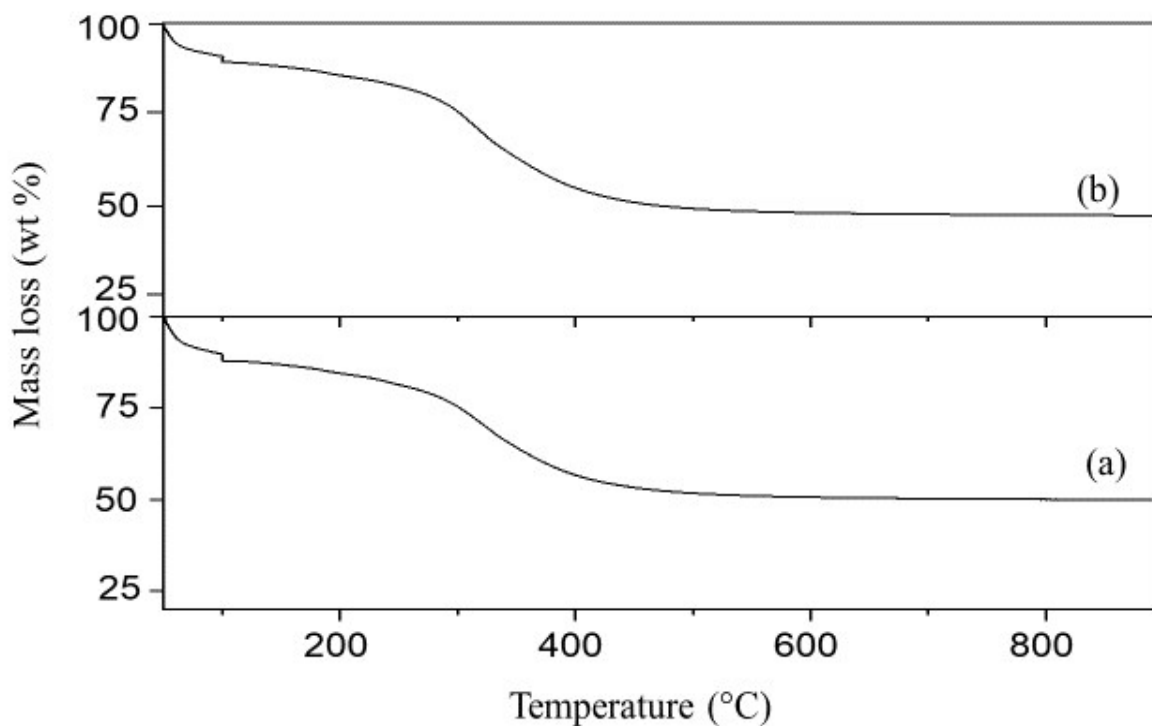


## Electronic Supporting Information

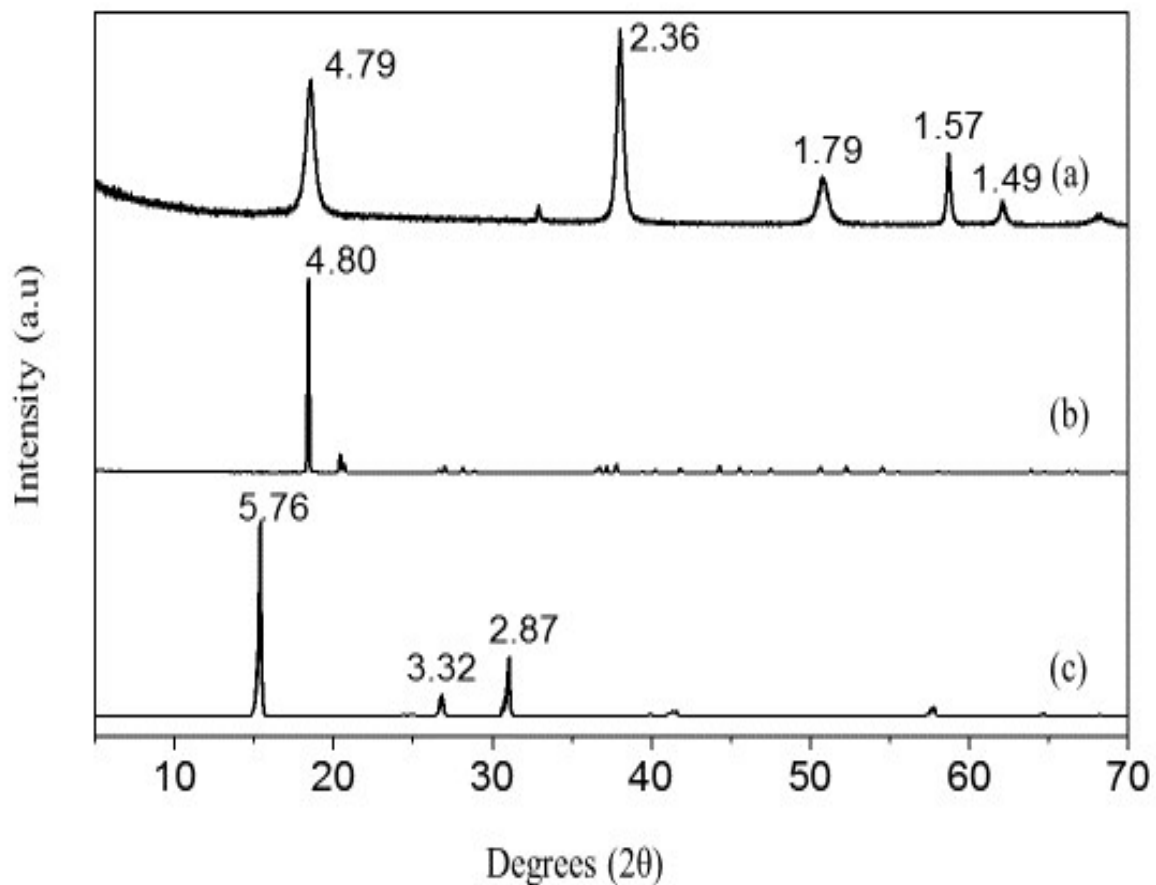
### Acetate intercalated Mg-Al layered double hydroxides (LDHs) through modified amide hydrolysis: A new route to synthesize novel mixed metal oxides (MMOs) for CO<sub>2</sub> capture.

G. V. Manohara, David Norris, M. Mercedes Maroto-Valer, Susana Garcia\*

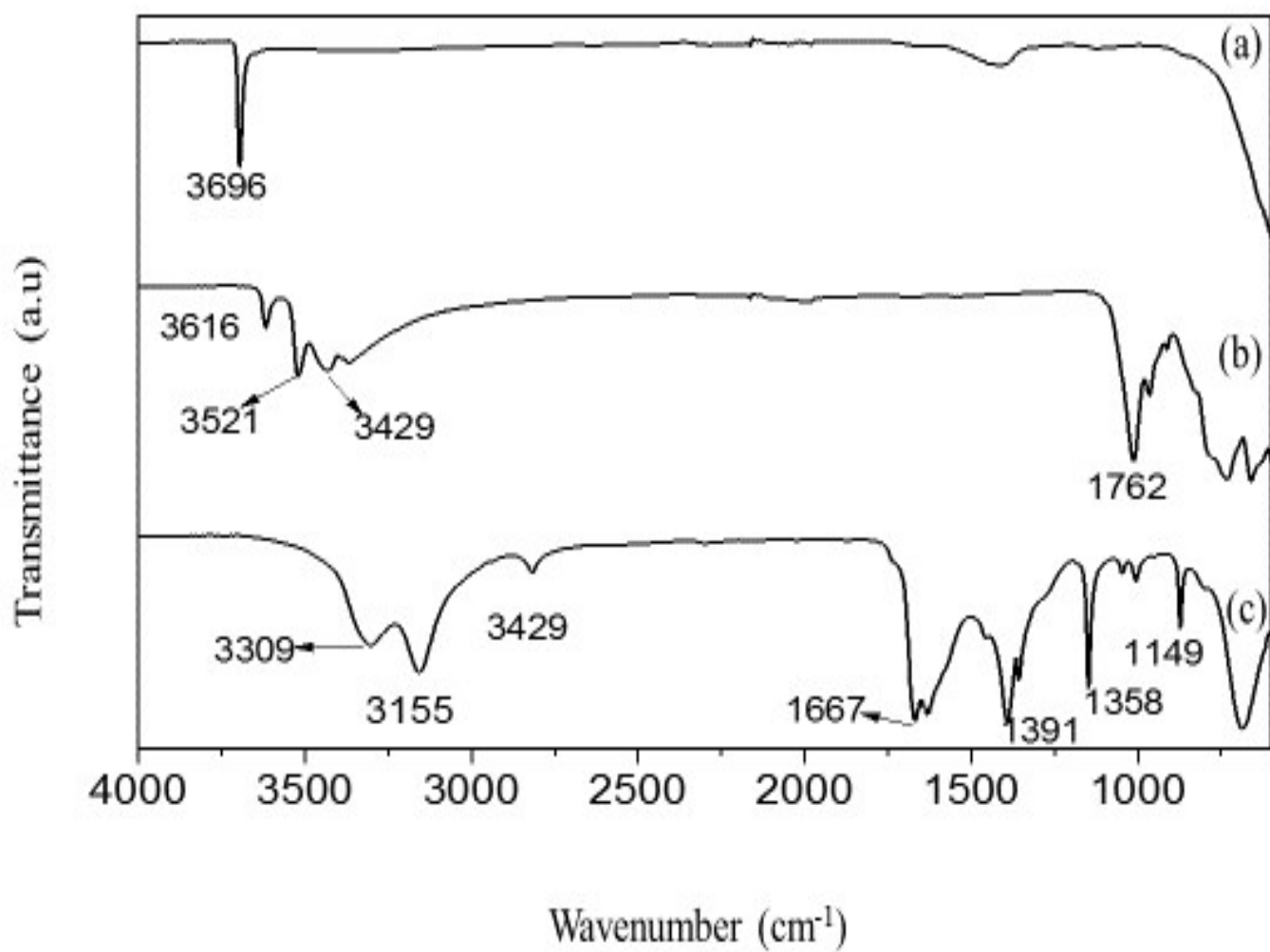
Research Centre for Carbon Solutions (RCCS), School of Engineering and Physical Sciences,  
Heriot-Watt University, Edinburgh EH14 4AS, United Kingdom



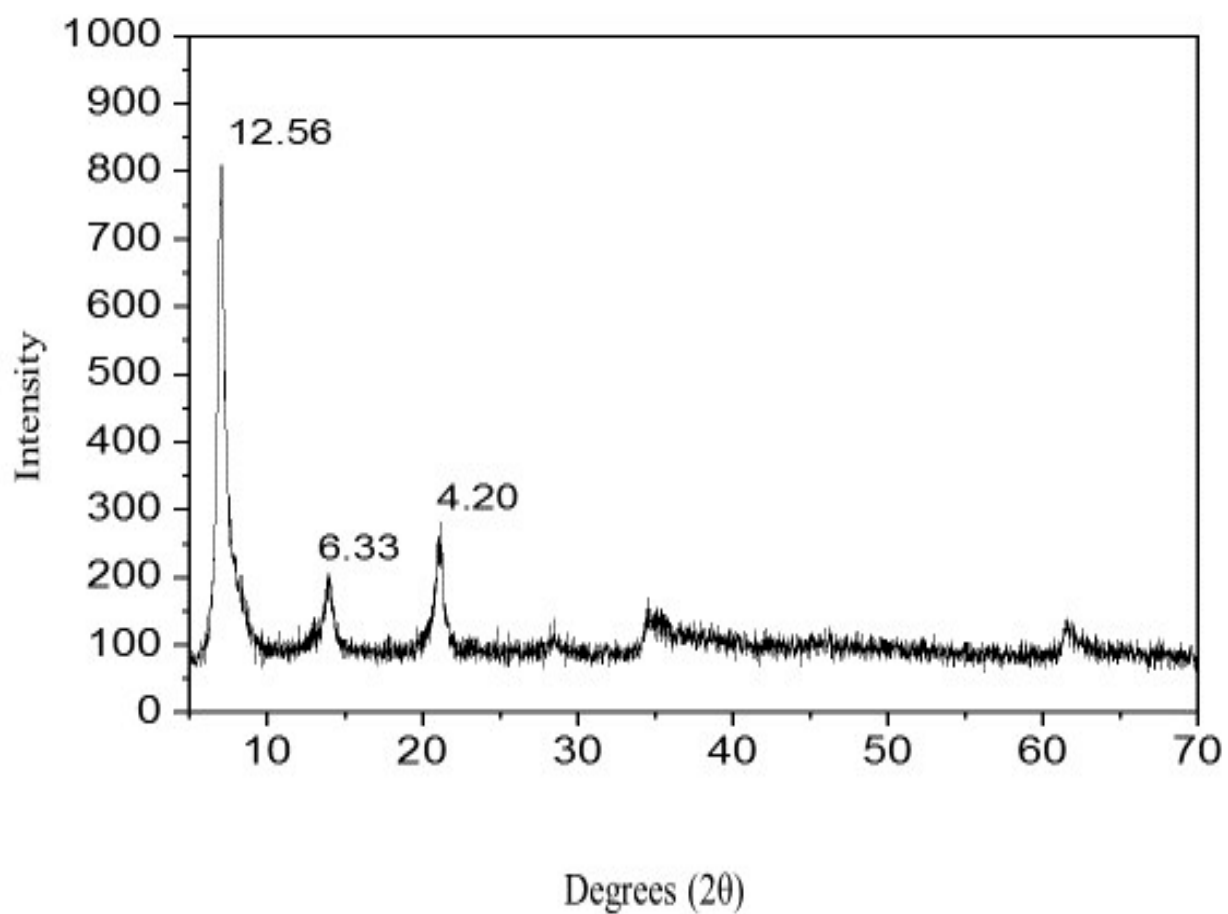
**Fig. S1** TGA profiles (Under N<sub>2</sub>) of Mg-Al-acetate LDHs prepared by acetamide hydrolysis (a) Mg/Al = 3 and (b) Mg/Al = 4.



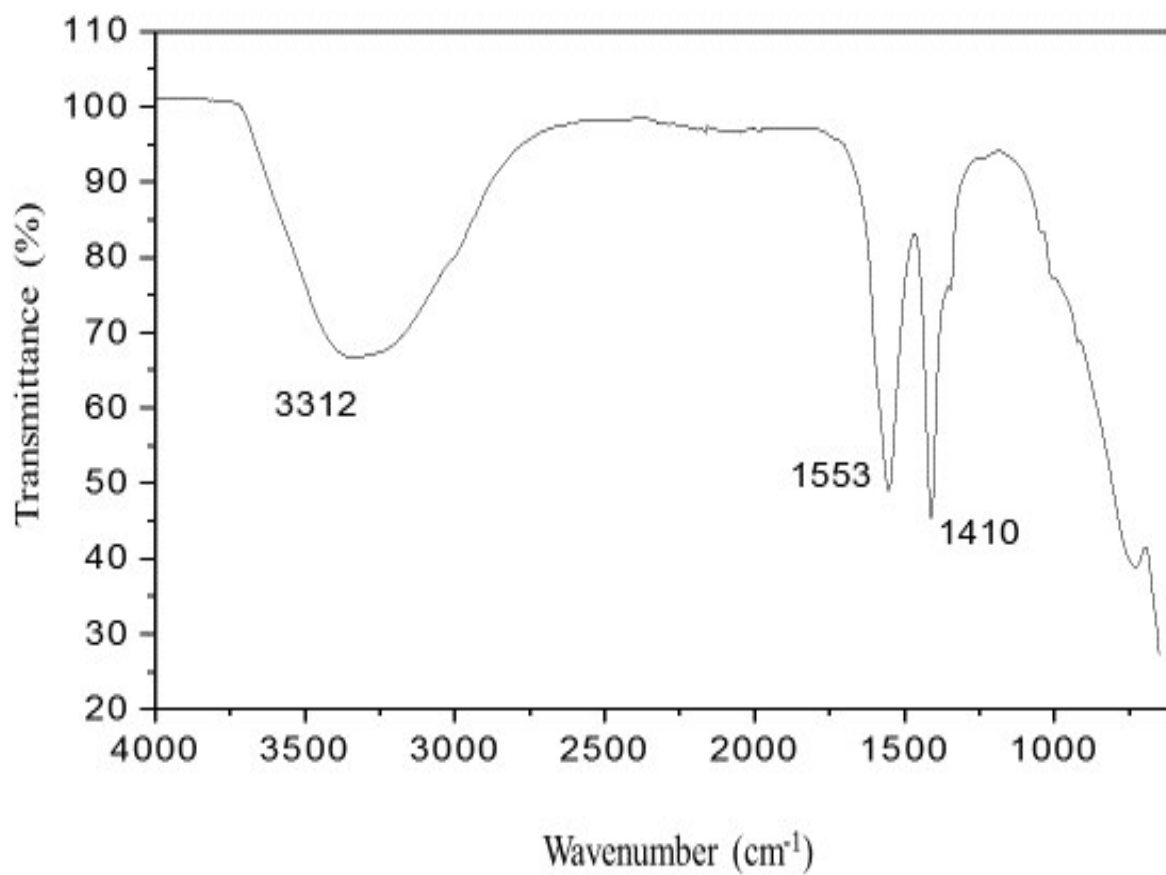
**Fig. S2** XRD patterns of (a) Mg(OH)<sub>2</sub>, (b) Al(OH)<sub>3</sub>, (c) acetamide used in the synthesis of Mg-Al-acetate LDHs by acetamide hydrolysis. Values given on reflections corresponds to *d*-spacing in Å.



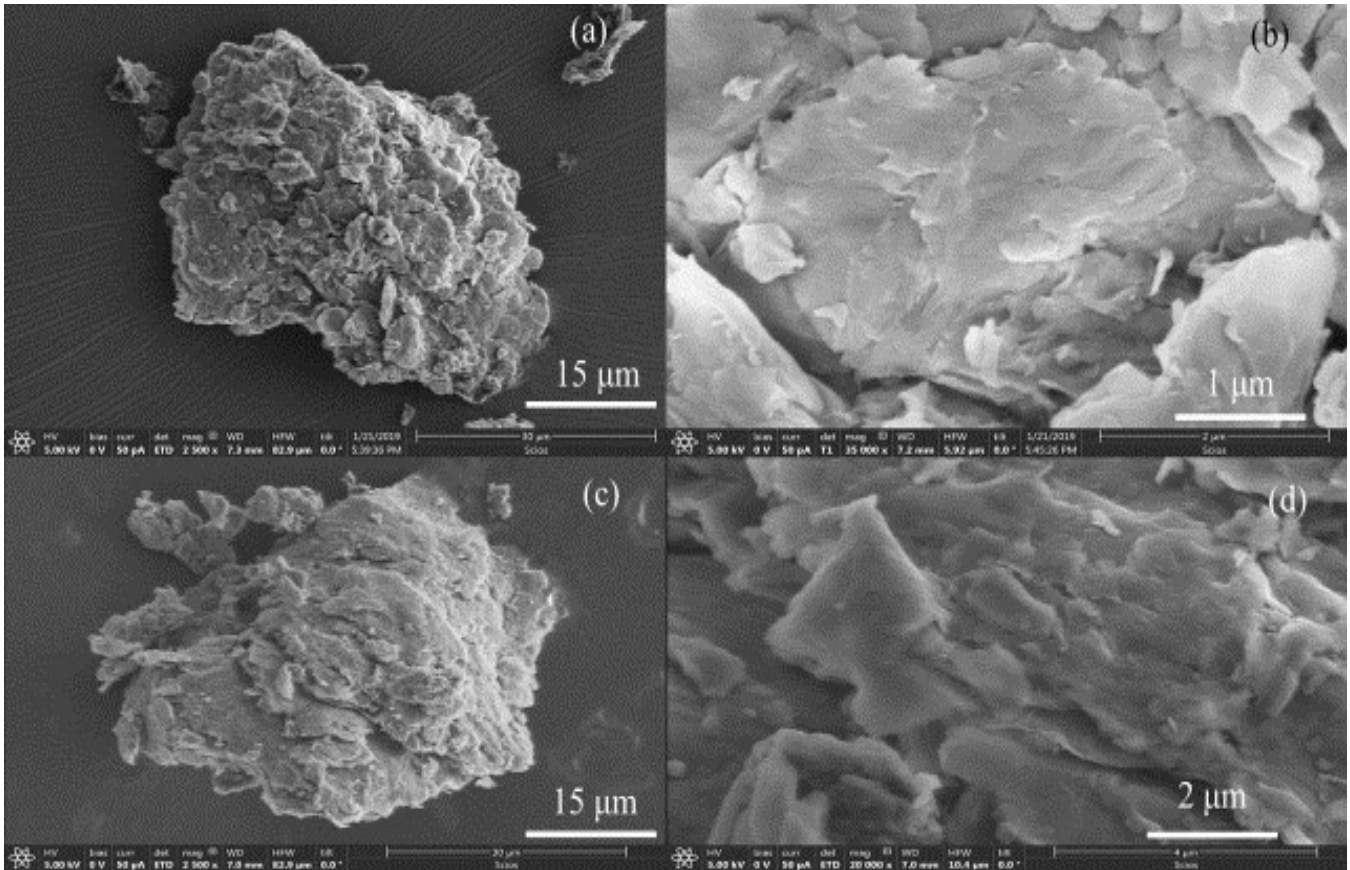
**Fig. S3** FTIR spectrum of (a) Mg(OH)<sub>2</sub>, (b) Al(OH)<sub>3</sub>, (c) acetamide used in the synthesis of Mg-Al-acetate LDHs by acetamide hydrolysis.



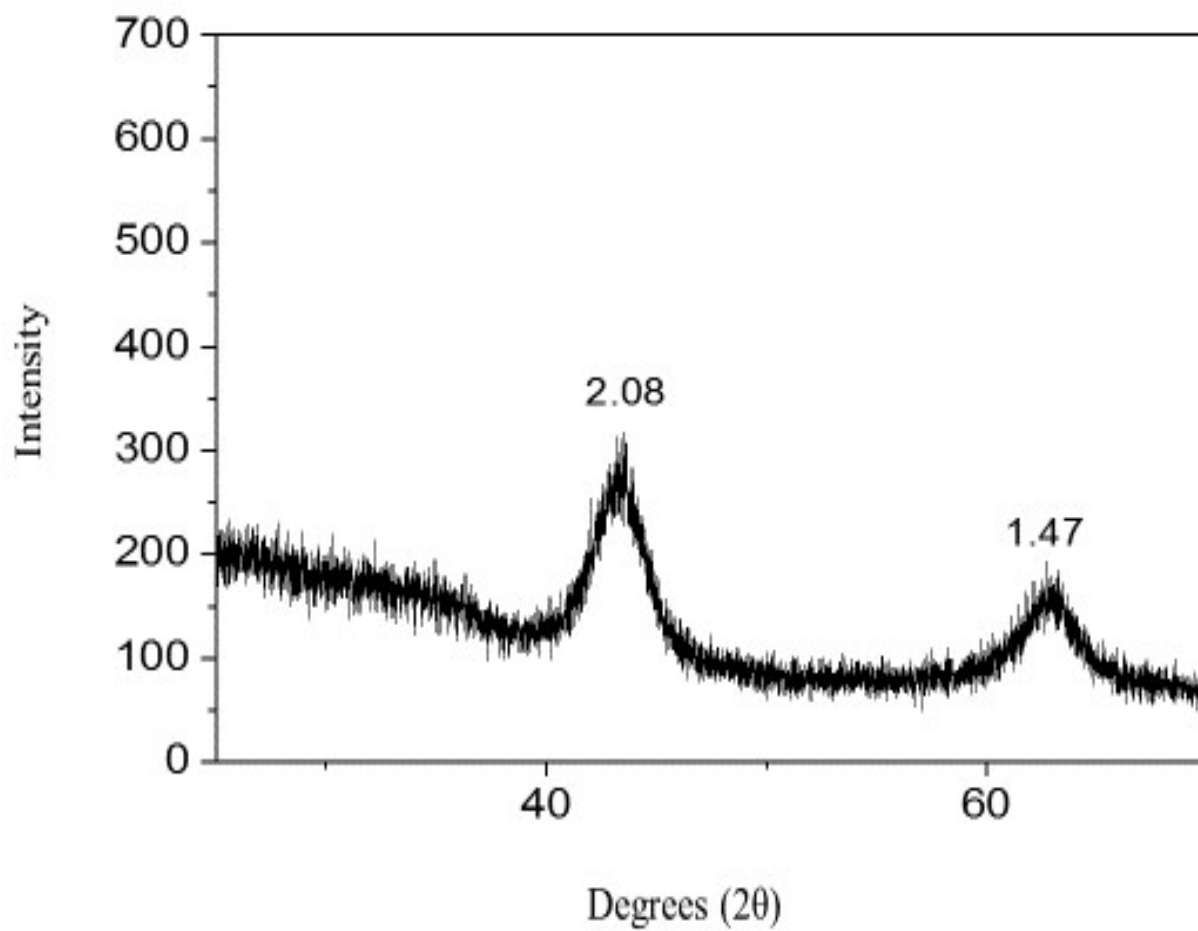
**Fig. S4** XRD pattern of Mg-Al-acetate LDH prepared by anion exchange starting from Mg-Al-NO<sub>3</sub> LDH. Values given on reflections are corresponds to *d*-spacing in Å.



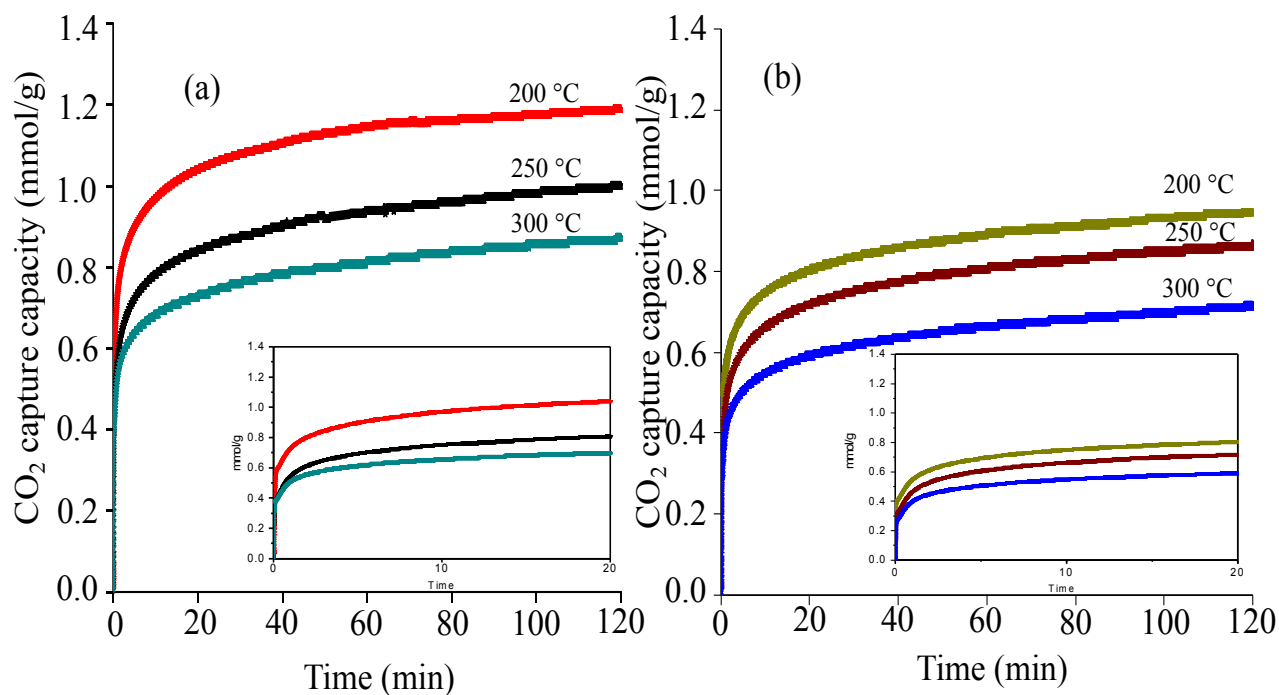
**Fig. S5 FTIR spectrum of Mg-Al-acetate LDH prepared by anion exchange starting from Mg-Al-NO<sub>3</sub> LDH.**



**Fig. S6 SEM images of anion exchanged Mg-Al-acetate LDH (a, b) and it's derived MMOs (c, d).**



**Fig. S7** PXR D pattern of MMOs derived from Mg-Al-acetate LDH prepared by anion exchange starting from Mg-Al-NO<sub>3</sub> LDH. Values given on reflections are corresponds to *d*-spacing in Å.



**Fig. S8** CO<sub>2</sub> capture profiles vs time (TGA, 86 % CO<sub>2</sub>) of the MMOs derived from Mg-Al-acetate LDHs (a) Mg/Al = 4 and (b) Mg/Al = 3, prepared by acetamide hydrolysis. Inset in the figure (a) & (b) shows the CO<sub>2</sub> capture profile for the first 20 min.