(Supplementary information)

A lamellar structure zeolite LTA for CO_2 capture

Jie Shen[a], Qi Sun[a,*], Jun Cao[b], Peng Wang[c], Weilin Jia[a], Suyang Wang[a], Ping Zhao[d], Zepeng Wang[d]

[a]*College of Materials and Metallurgy, Guizhou University, Guiyang, 550025, China*

[b]*College of Materials Science and Chemistry, China University of Geosciences, Wuhan, 430074,China*

[c]*College of Optical and Electronic Information, Huazhong University of Science and Technology, Wuhan, 430074, China*

[d]*Geological Brigade 105, Bureau of Geology and Mineral Exploration and Development of Guizhou Province, Guiyang, 550018, China*

* *Corresponding author: qsun@gzu.edu.cn*

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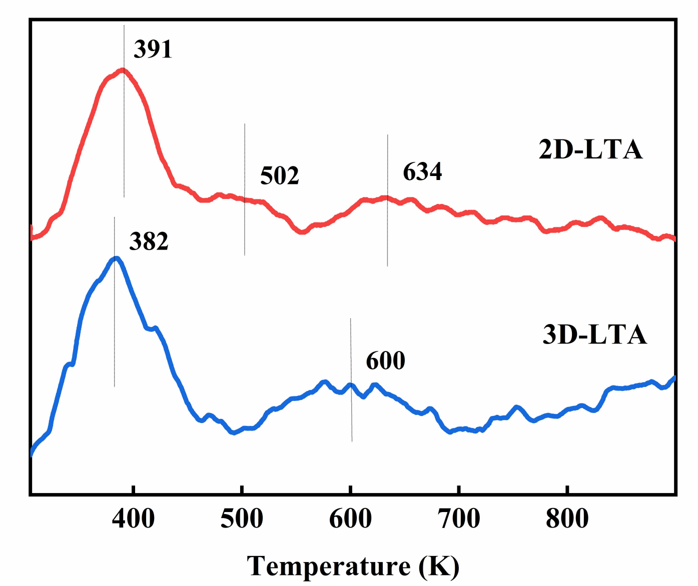

Fig. S1. The NH_3-TPD of 2D and 3D zeolite.

There were many solid acid centers on the surface of the zeolites after calcination, such as Brønsted and Lewis acid.[46] These solid acid centers were actually the active sites of the zeolites and the acid strength was tested by NH_3-TPD. The active sites of zeolite were usually distributed on the trivalent Al^+ inside the skeleton. The advantage of the 2D zeolite LTA with a large specific surface area compared to 3D zeolite was that the skeleton aluminum ions were more easily exposed to the surface, resulting in more active sites.

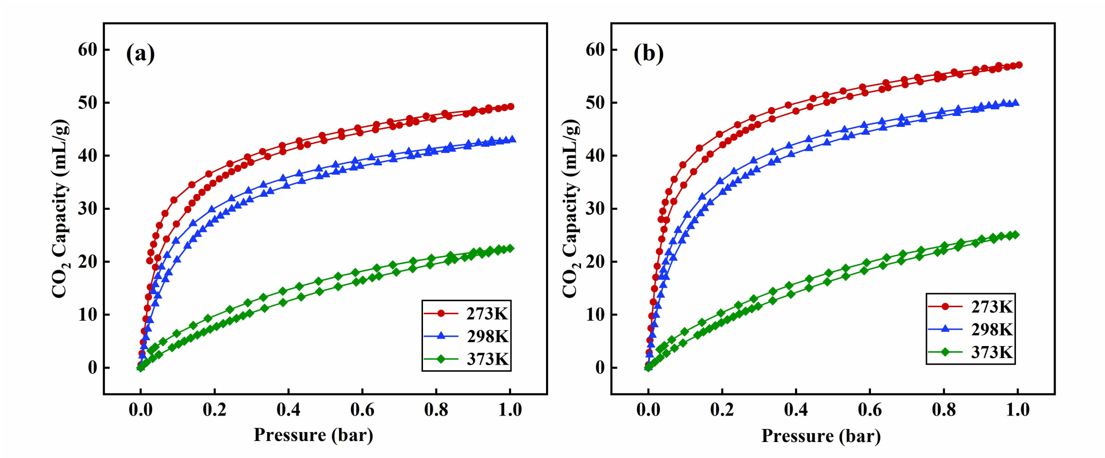

Fig. S2. CO_2 adsorption-desorption isotherms of the zeolites with (a)3D, (b)2D.

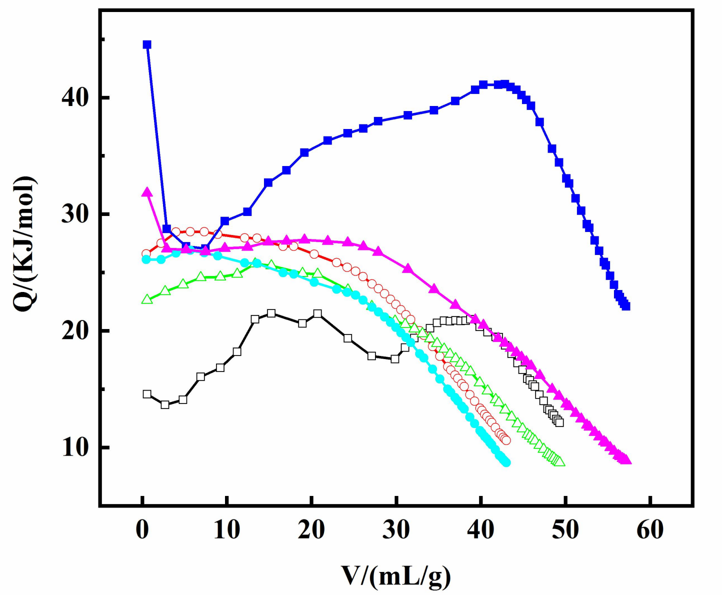

Fig. S3. Heat of adsorption of zeolites. Closed symbol: 2D-LTA; open symbol: 3D-LTA. (Square: 273-298 K; triangle: 298-373 K; circular:273-373 K)

The heat of adsorption was calculated by Clausius-Clapeyron equation:

$$Q = \frac{RT_1T_2 \ln (P_2/P_1)}{T_2 - T_1}$$

Where Q is heat of adsorption, KJ/mol; R is gas constant, 8.314J/mol; T is adsorption temperature, K; P is adsorption pressure, bar.

Table S1. Comparison of CO_2 and CO_2/CH_4 selectivity with different materials.

Sample	Temperature /K	CO_2 Capacity /mmol·g^{-1}	CO_2/CH_4 Selectivity	Reference
2D-LTA	273	2.55[a]	-	This work
	298	2.23[a]	76.76	This work
3D-LTA	273	2.20[a]	-	This work
	298	1.92[a]	5.93	This work
ZIF-68	298	1.68	5.0	9
ZIF-69	273	1.81	5.1	9
ZIF-70	298	2.45	5.2	9
ZIF-78	298	2.30	10.6	9
ZIF-79	298	1.49	5.4	9
ZIF-81	298	1.70	5.7	9
ZIF-82	298	2.35	9.6	9
NaA-RS	273	2.26	-	10
	303	1.15	-	10
	333	0.53	-	10
TEPA-ZSM-5	298	0.15	-	11
TEPA-ZY	298	1.12	-	11
TEPA-SAOP-34	298	0.45	-	11
NaA	273	3.5	-	12
	298	3.1	-	12
5A	293	1.86	24.9	13
SAPO-34	303	2.4[b]	3.8	14
ZSM-5	303	1.5[b]	2.4	14
K-ETS-10	298	2.53	52.5	15
As-synthesized-10	298	2.01	49.6	15
PEHA/CDMC	373	3.72	-	16
	298	2.50	-	16

[a] (x mL·g^{-1})/(22.4L·mol^{-1})=y mmol·g^{-1}

[b] P=2bar