Electronic Supplementary Material (ESI) for Inorganic Chemistry Frontiers.

Supporting Information of

ZIF-derived *in situ* nitrogen decorated porous carbons for CO_2 capture

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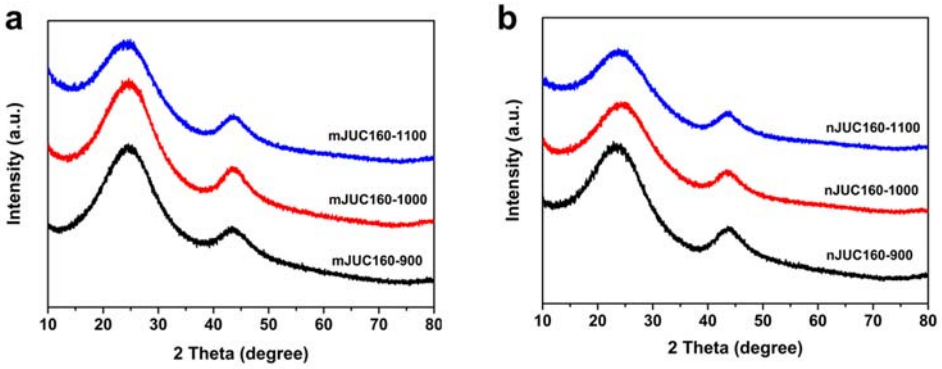

Fig. S1 PXRD patterns of (a) **mJUC160** derived porous carbon materials and (b) **nJUC160** derived porous carbon materials.

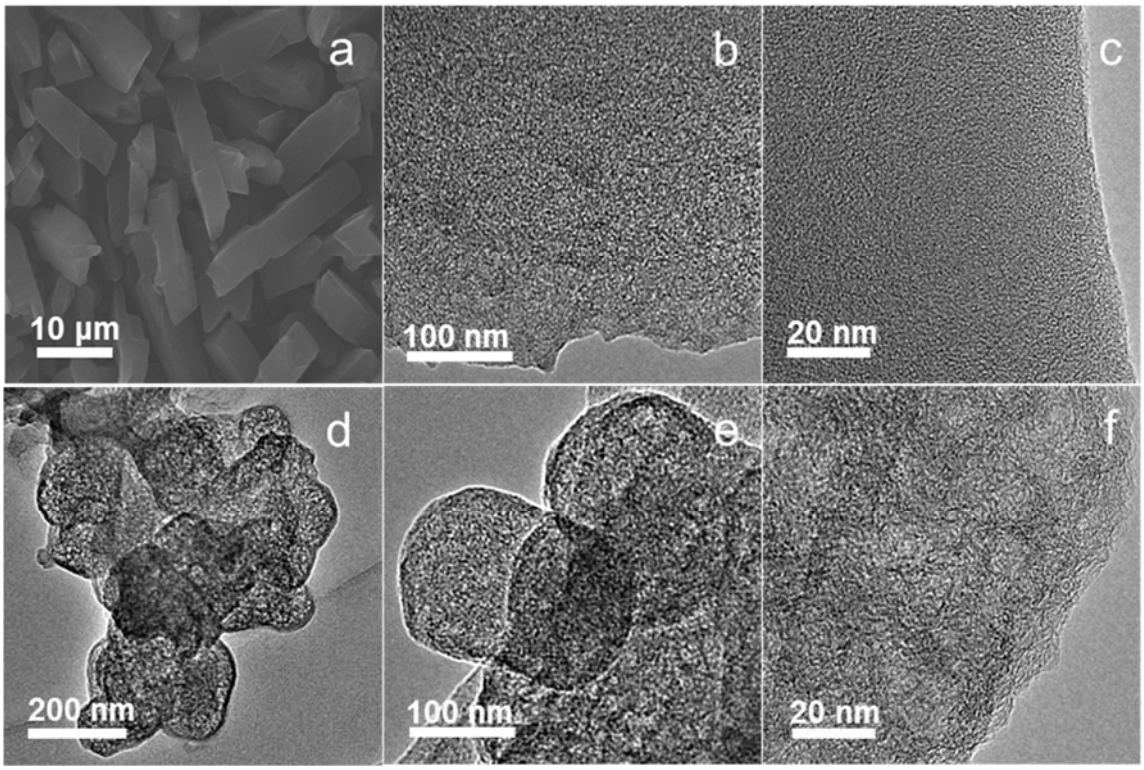

Fig. S2 (a) SEM images of **mJUC160-900**； (b, c) TEM images of **mJUC160-900**; (d, e, f) TEM images of **nJUC160-900**.

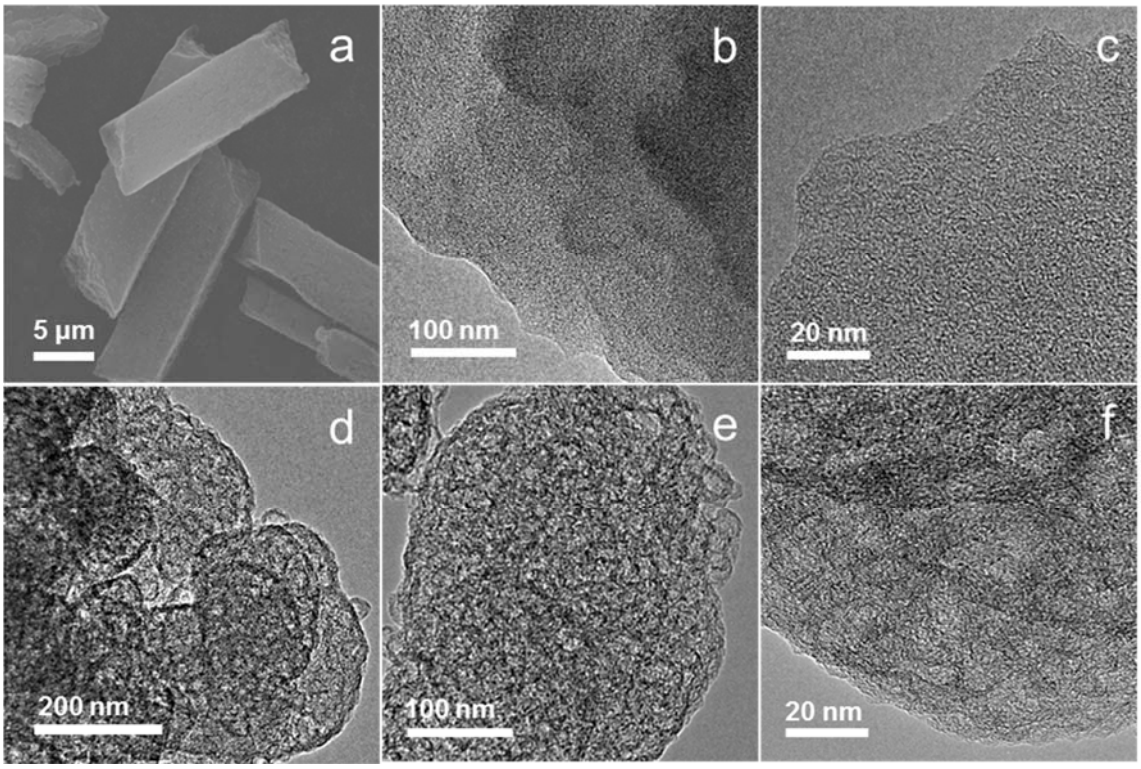

Fig. S3 (a) SEM images of **mJUC160-1000**； (b, c) TEM images of mJUC160-1000; (d, e, f) TEM images of **nJUC160-1000**.

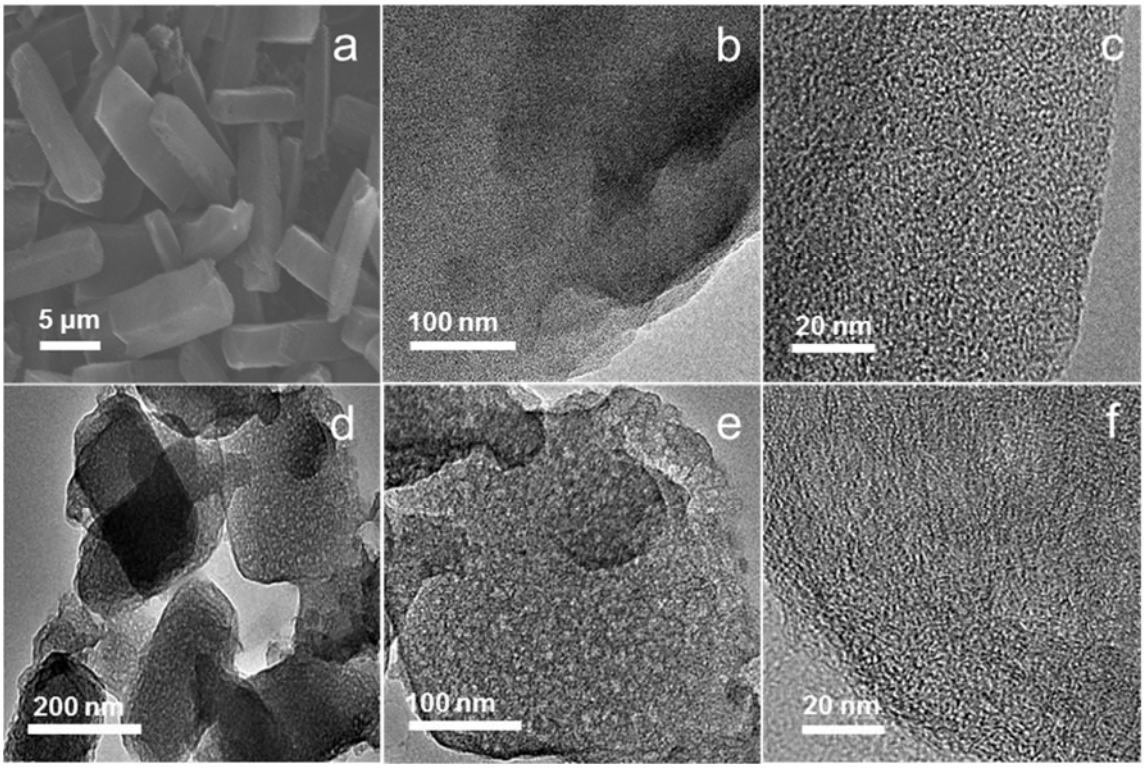

Fig. S4 (a) SEM images of **mJUC160-1100**； (b, c) TEM images of **mJUC160-1100**; (d, e, f) TEM images of **nJUC160-1100**.

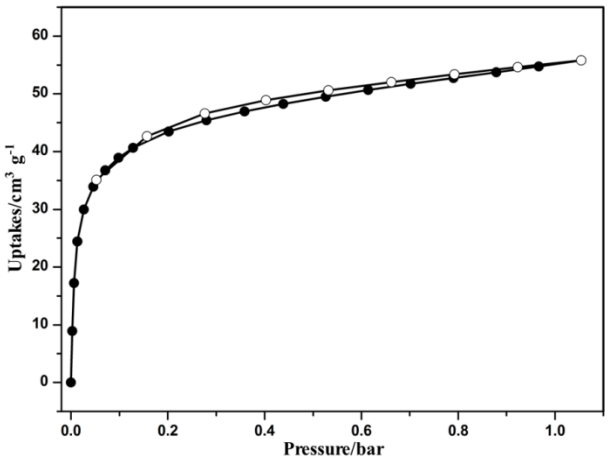

Fig. S5 Carbon dioxide sorption isotherms of the activated **JUC-160** at 195 K.

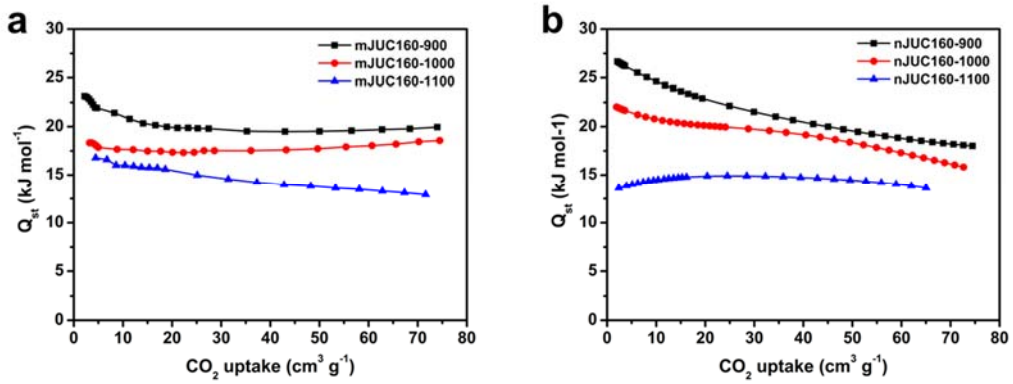

Fig. S6 Isosteric heat of adsorption (Q_{st}) (a) **mJUC160-*T***, (b) **nJUC160-*T*** calculated using the Clausius−Clapeyron equation, based on the CO_2 adsorption isotherms at 273, 298 K.

Ideal Adsorption Solution Theory (IAST)

We used the IAST of Myers and Prausnitz[1,2] along with the single-component adsorption isotherm fits to determine the molar loadings in the mixture for specified partial pressures in bulk phases. The single-component loadings at 298 K were fitted with a single-site Langmuir-Freundlich model.

IAST predicts the mixture adsorption equilibriums using single-component adsorption isotherms and is defined by [3]

$$S_{CO_2/N_2} = \frac{q_1/q_2}{p_1/p_2}$$

where q_1 and q_2 are the CO_2 and N_2 uptake capacities (mmol g^{-1}), p_1 and p_2 are the specified partial pressures in the mixture, respectively.

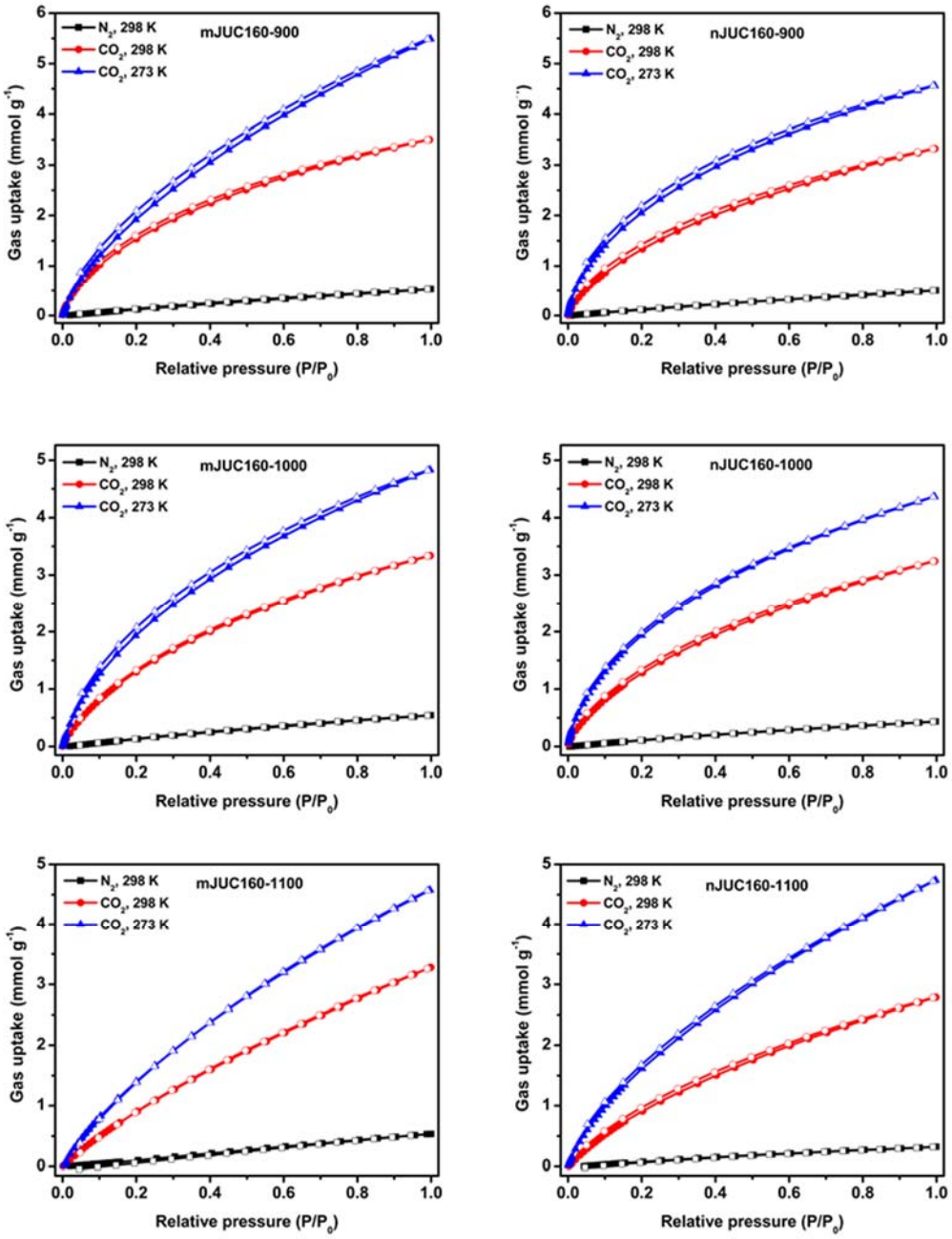

Fig. S7 Gas sorption capacities for **mJUC160-*T*** and **nJUC160-*T***, CO_2 at 273 K (blue), 298 K (red) and N_2 at 298 K (black).

References

1 A. L. Myers, J. M. Prausnitz, *AIChE J.,* 1965, **11**, 121−130.
2 A. L. Myers, *Adsorption,* 2003, **9**, 9-16.
3 W. G. Lu, J. P. Sculley, D. Q. Yuan, R. Krishna, Z. W. Wei and H. C. Zhou, *Angew. Chem., Int. Ed.*, 2012, **51**, 7480-7484.