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Electronic Supplementary Information

An indium-organic framework for efficient storage of light hydrocarbons and selective removal of organic dyes †

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1. PXRD patterns of FJI-H21.

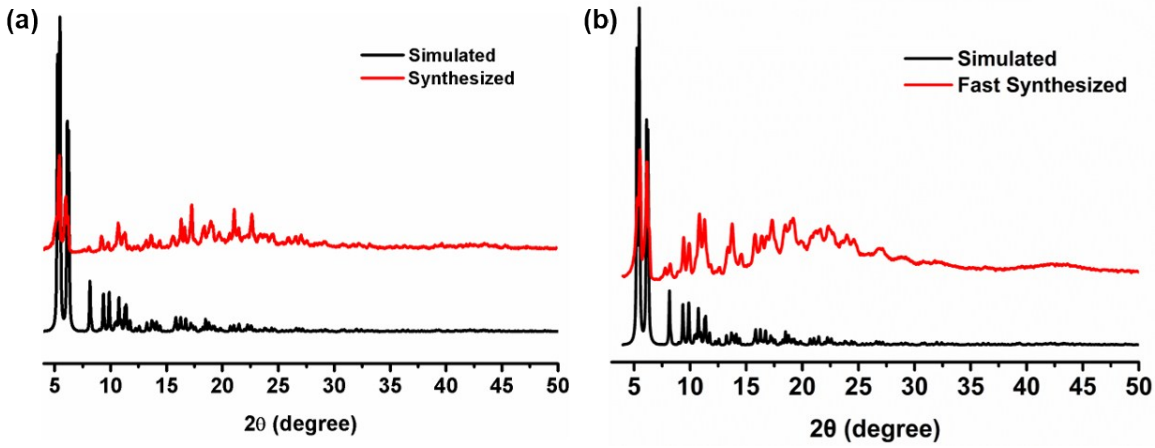

Fig. S1 (a) PXRD patterns of simulated and as-synthesized **FJI-H21** samples. (b) PXRD patterns of simulated and fast synthesized sample of **FJI-H21**.

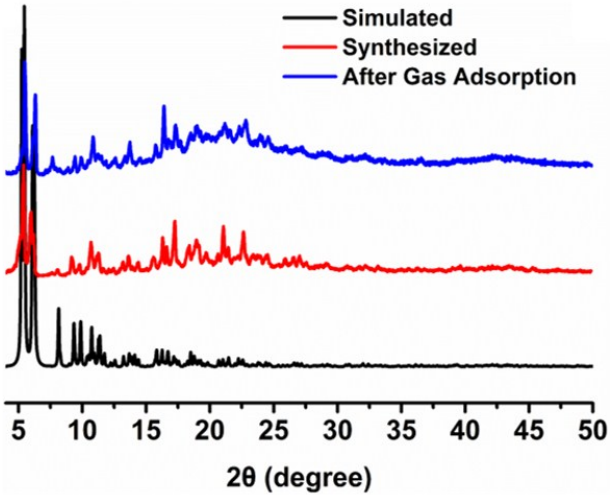

Fig. S2 PXRD patterns of simulated, as-synthesized and after gas adsorption samples.

2. Thermogravimetric analysis (TGA)

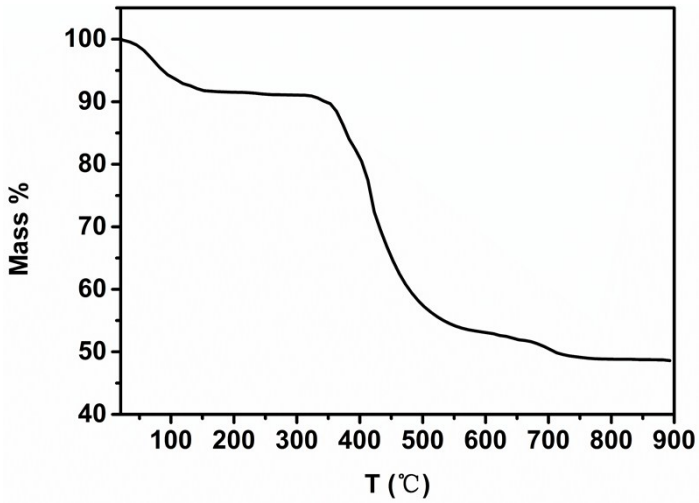

Fig. S3 The TGA plot of **FJI-H21** under N_2 atmosphere.

3. The N_2 sorption isotherms and pore size distribution of FJI-H21.

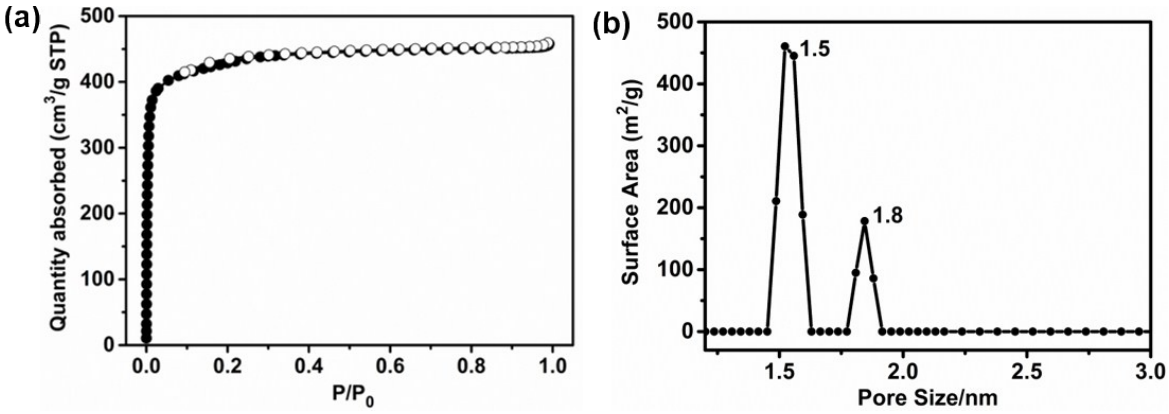

Fig. S4 (a) The N_2 sorption isotherms and (b) pore size distribution of **FJI-H21** sample at 77 K and 1 bar.

4. The photographs of different sizes FJI-H21.

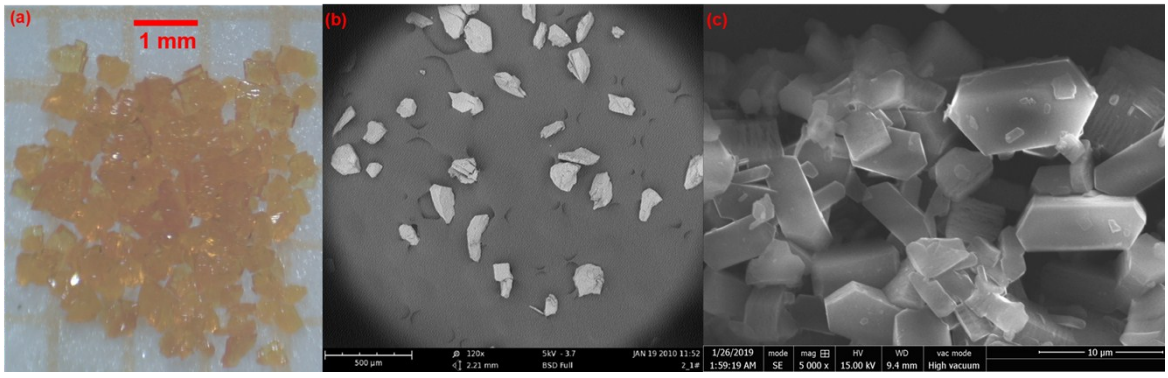

Fig. S5 (a) The microscope photographs of block **FJI-H21** crystal. (b) The scanning electron microscope photographs of 100 - 200 um **FJI-H21** crystal. (c) The scanning electron microscope photograph of rapid synthesized **FJI-H21** crystal.

5. UV-Vis spectra

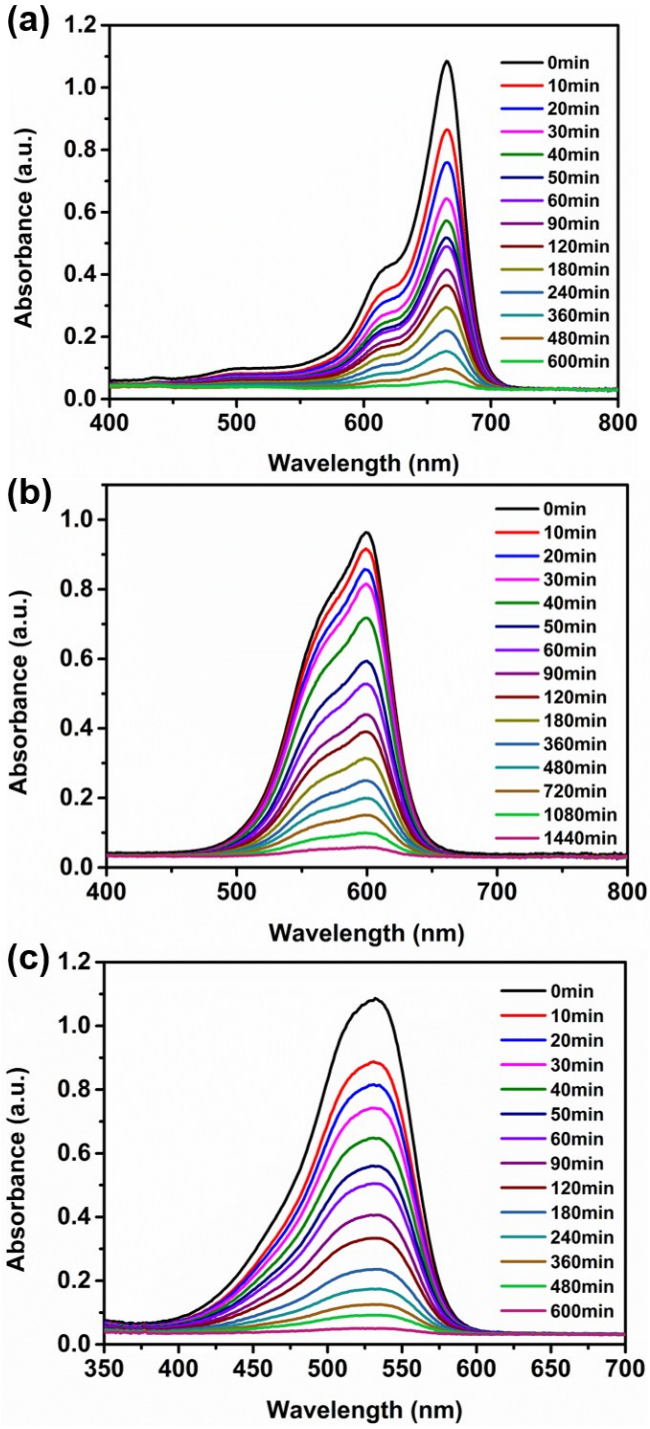

Fig. S6 UV-Vis spectra changes of (a) MB, (b) EV and (c) GTL dye solution over block **FJI-H21**.

6. Adsorption kinetics plots and the corresponding plots of pseudo-second order fitting.

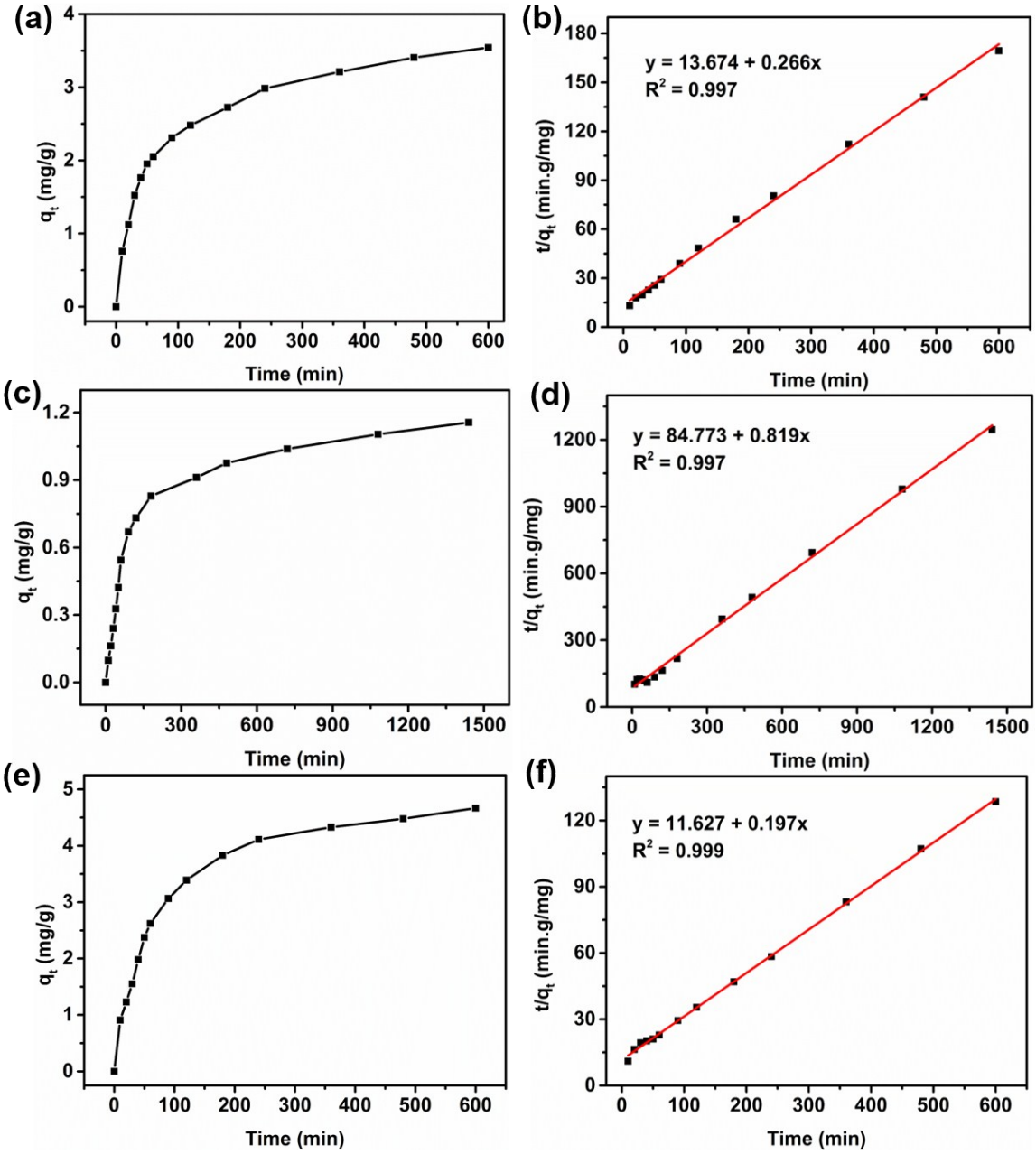

Fig. S7 Adsorption kinetics isotherm of (a) MB, (c) EV and (e) GTL; the corresponding plots of pseudo-second order fitting plots of (b) MB, (d) EV and (f) GTL over block **FJI-H21**.

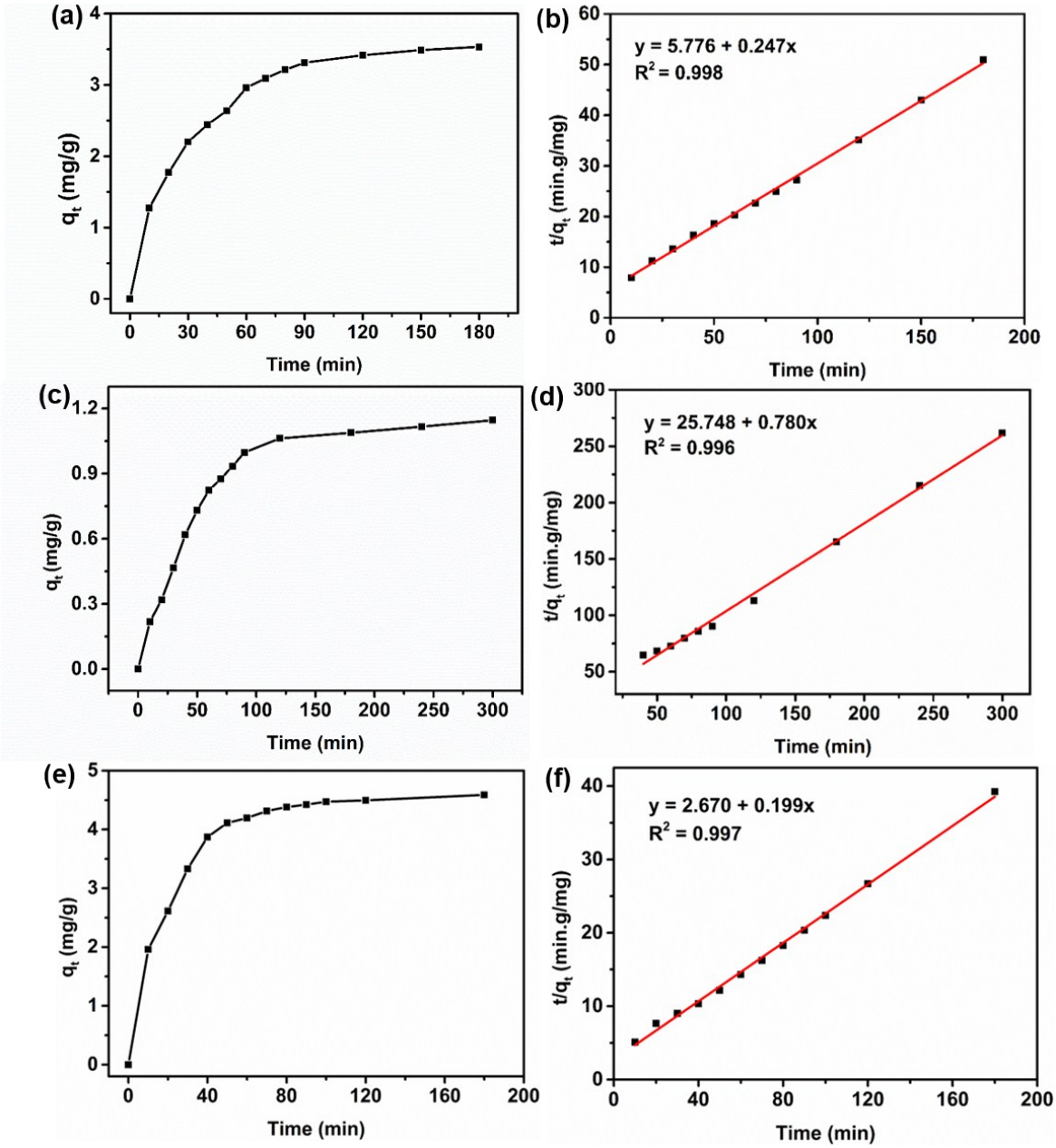

Fig. S8 Adsorption kinetics of (a) MB, (c) EV and (e) GTL; the corresponding plots of pseudo-second order fitting plots of (b) MB, (d) EV and (f) GTL with 100 - 200 μm **FJI-H21**.

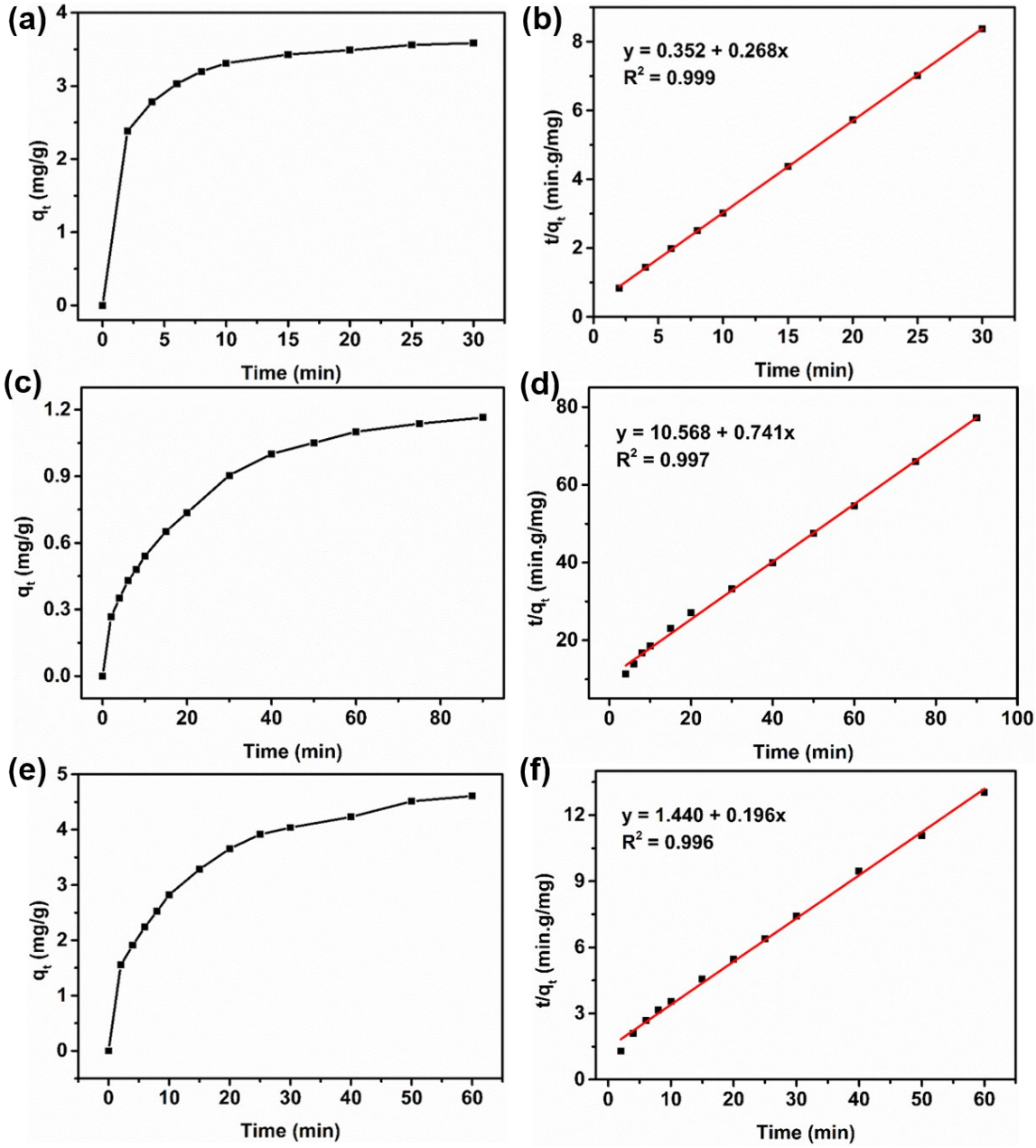

Fig. S9 Adsorption kinetics of (a) MB, (c) EV and (e) GTL; the corresponding plots of pseudo-second order fitting plots of (b) MB, (d) EV and (f) GTL with ca. 10 μm **FJI-H21**.

7. The adsorption isotherms and Langmuir plots of the isotherms for MB.

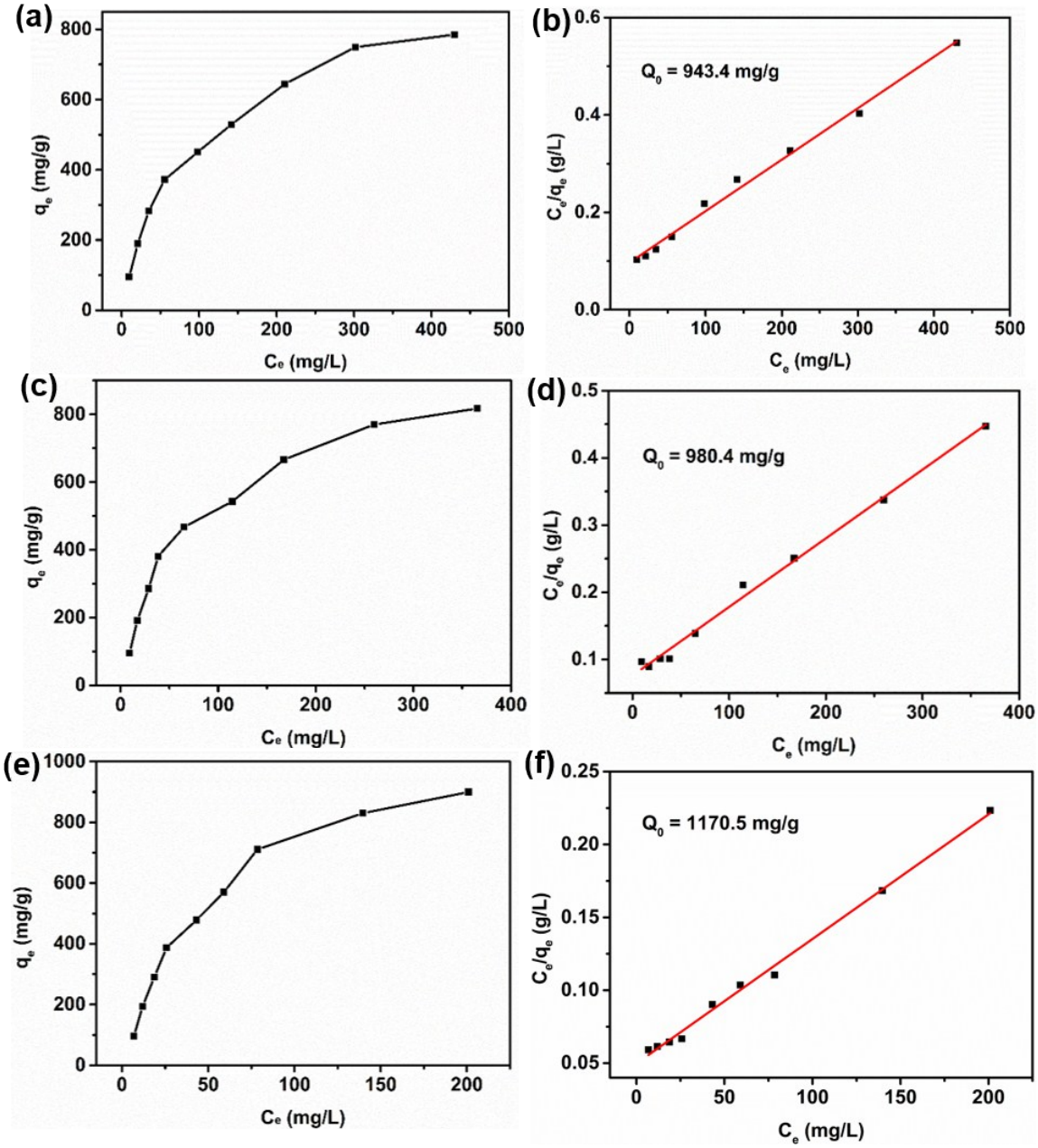

Fig. S10 The adsorption isotherms for MB with different particle sized **FJI-H21**, (a) block crystals, (b) particle size in 100 - 200 μm and (c) particle size less than 10 μm. Langmuir plots of the isotherms for MB with different particle sized **FJI-H21**, (a) block crystals, (b) particle size in 100 - 200 μm and (c) particle size ca. 10 μm.

8. UV-Vis spectra of solutions of (a) MO, (b) CR, (c) SR I and (d) SR III.

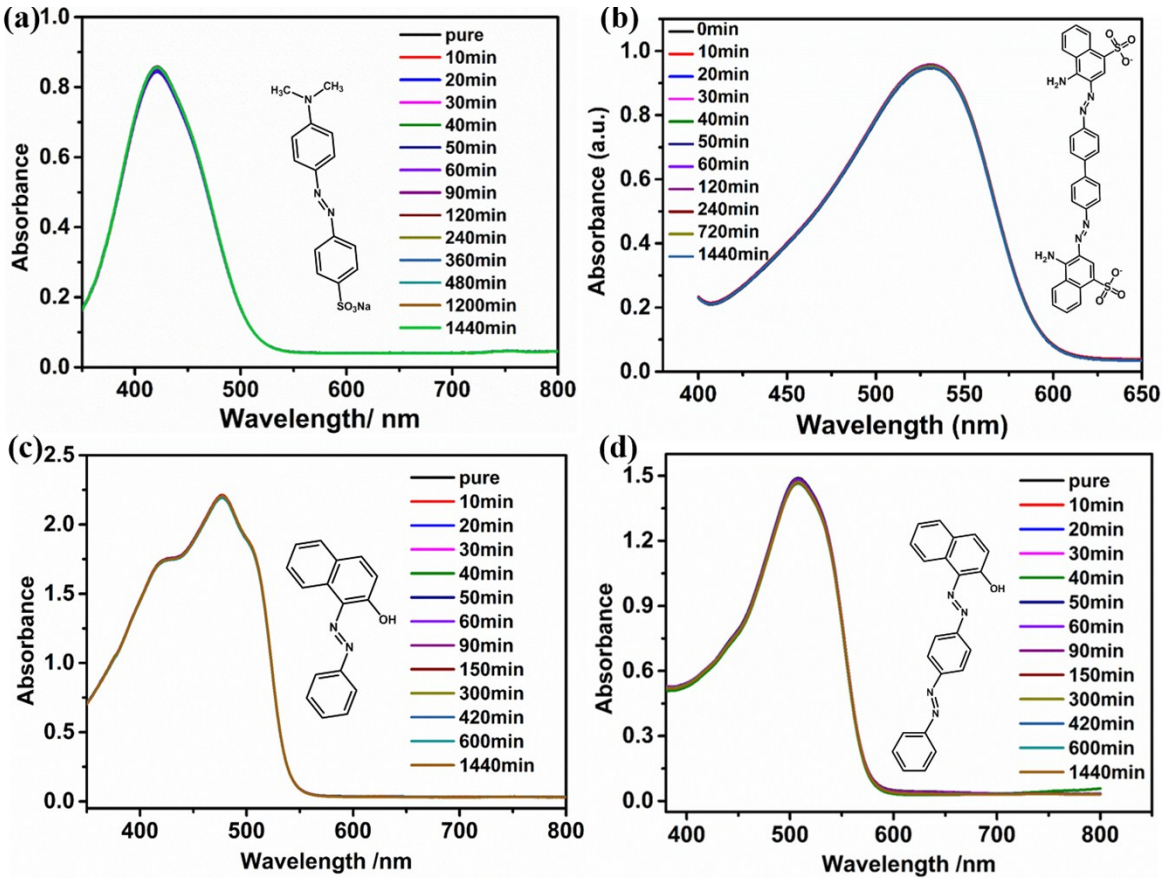

Fig. S11 UV-Vis spectra of solutions of (a) MO, (b) CR, (c) SR I and (d) SR III during the soaking of **FJI-H21**.

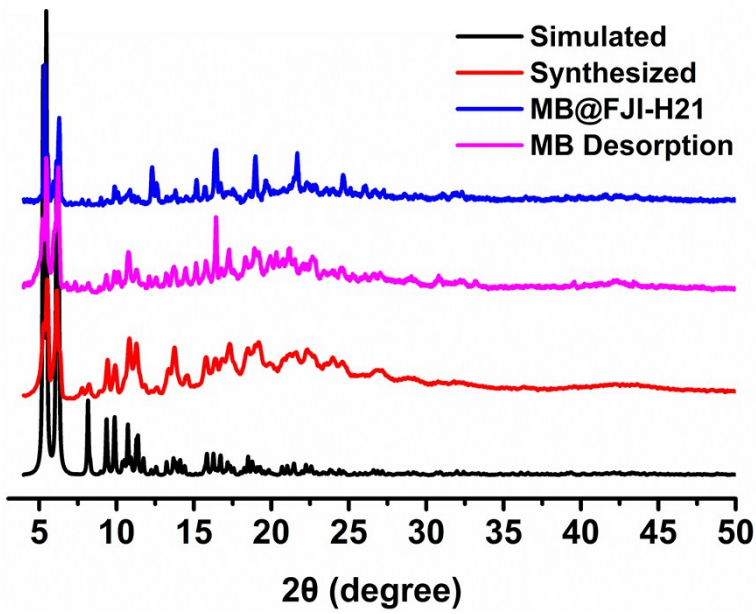

Fig. S12 PXRD patterns of simulated, as-synthesized, and MB adsorption/desorption with fast synthesized **FJI-H21** samples.

9. UV-Vis calibration curve for MB.

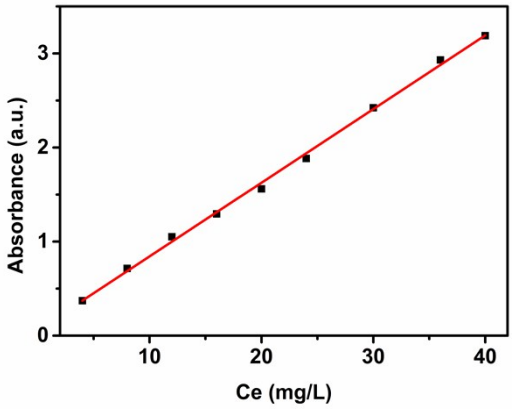

Fig. S13 UV-Vis calibration curve for MB (c, R^2 = 0.998) at 665 nm.

10. Comparison of selectivities.

Table. S1 The comparison of C2 hydrocarbons / CH_4 selectivity adsorption in different MOFs calculated by the IAST method.

MOFs	Selectivity				
	C_2H_2/CH_4	C_2H_4/CH_4	C_2H_6/CH_4	Condition	References
FJI-H21	16.3	13.8	17.1	298 K, 1 bar	This work
$\{[Sr(BDPO)_{0.5}(H_2O)]_2H_2O\}_n$	-	-	22.4	298 K, 1 bar	[1]
JLU-Liu6	-	-	20.4	298 K, 1 bar	[2]
UTSA-35a	19	8	13.5	296 K, 1 bar	[3]
InOF-1	-	-	17	298 K, 1 bar	[4]
PCN-224	-	-	12	298 K, 1 bar	[5]
ZnSBD	16.9	15.9	23.2	298 K, 1 bar	[6]
JLU-Liu37	-	-	11	298 K, 1 bar	[7]
FJI-C4	51	22.1	39.7	298 K, 1 bar	[8]
UPC-33	7.78	4.48	4.80	298 K, 1 bar	[9]
BUT-70A	66.6	-	-	298 K, 1 bar	[10]
NAC-700	47.1	45.1	65.7	298 K, 1 bar	[11]
JLU-Liu51	-	-	7.5	298 K, 1 bar	[12]

Table. S2 The comparison of C3 hydrocarbons / CH_4 selectivity adsorption in different MOFs calculated by the IAST method.

MOFs	Selectivity				
	C_3H_4/CH_4	C_3H_6/CH_4	C_3H_8/CH_4	Condition	References
FJI-H21	383.2	172.9	145.2	298 K, 1 bar	This work
JLU-Liu5	-	-	107.8	298 K, 1 bar	[2]
JLU-Liu6	-	-	274.6	298 K, 1 bar	[2]
UTSA-35a	-	-	80	296 K, 1 bar	[3]
InOF-1	-	-	90	298 K, 1 bar	[4]
PCN-224	-	-	609	298 K, 1 bar	[5]
JLU-Liu37	-	-	206	298 K, 1 bar	[7]
FJI-C4	-	-	293.4	298 K, 1 bar	[8]
UPC-33	-	42.4	41.8	298 K, 1 bar	[9]
NAC-700	-	419.8	501.9	298 K, 1 bar	[11]
JLU-Liu51	-	-	220	298 K, 1 bar	[12]
UPC-100-In	-	200.5	186.4	298 K, 1 bar	[13]
UPC-100-Zr	-	44	42.5	298 K, 1 bar	[13]
FIR-51	-	-	326.8	294 K, 1 bar	[14]
$[Zn_2(NH_2\text{-BTB})(2\text{-nim})]$	-	-	85	297 K, 1 bar	[15]
UiO-67	-	-	69.3	298 K, 1 bar	[16]

11. Comparison of MB Adsorption capacity.

Table. S3 MB Adsorption capacity comparison in different porous materials.

MOFs	Max. Ads. Capacity ($mg \cdot g^{-1}$)	Temperature K	References
MOF-235	187	298 K	[17]
$[Ca(HDCPP)_2(H_2O)_2](DMF)_{1.5}$	952	298 K	[18]
MIL-100(Fe)	736	303 K	[19]
NH_2 -MIL-101(Al)	762	303 K	[20]
MIL-100(Fe)	1105	308 K	[21]
ZJU-24	902	298 K	[22]
HKUST-1	183	298 K	[23]
$H_3PW_{12}O_{40}$@ZIF-8	810	298 K	[24]
$\{[(CH_3)_2NH_2]_3(In_3L_4)\}$ $(solvent)_x$	714	298 K	[25]
Crystal 2	725	298 K	[26]
FJI-C2	1323	298 K	[27]
$[Cd_2(H_2O)_2L]\cdot 5H_2O\cdot 0.5DMF$	1008	298 K	[28]
NOTT-102	850	298 K	[29]
BUC-17	850.5	298 K	[30]
FJI-H21-block	943	298 K	This work
FJI-H21-(100-200 μm)	980	298 K	This work
FJI-H21-(ca. 10 μm)	1186	298 K	This work

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