

Electronic Supplementary Information

Selective Dual Adsorption Performance of Hexagonal Porous Metal-Organic Framework Rods towards CO₂ gas and Organic Dye

*Hridoy Jyoti Bora, Neelotpal Sen Sarma and Anamika Kalita**

Physical Sciences Division, Institute of Advanced Study in Science and Technology, Paschim Boragaon, Guwahati-781035, Assam, India.

Corresponding Author's Email: anamik.kalita01@gmail.com

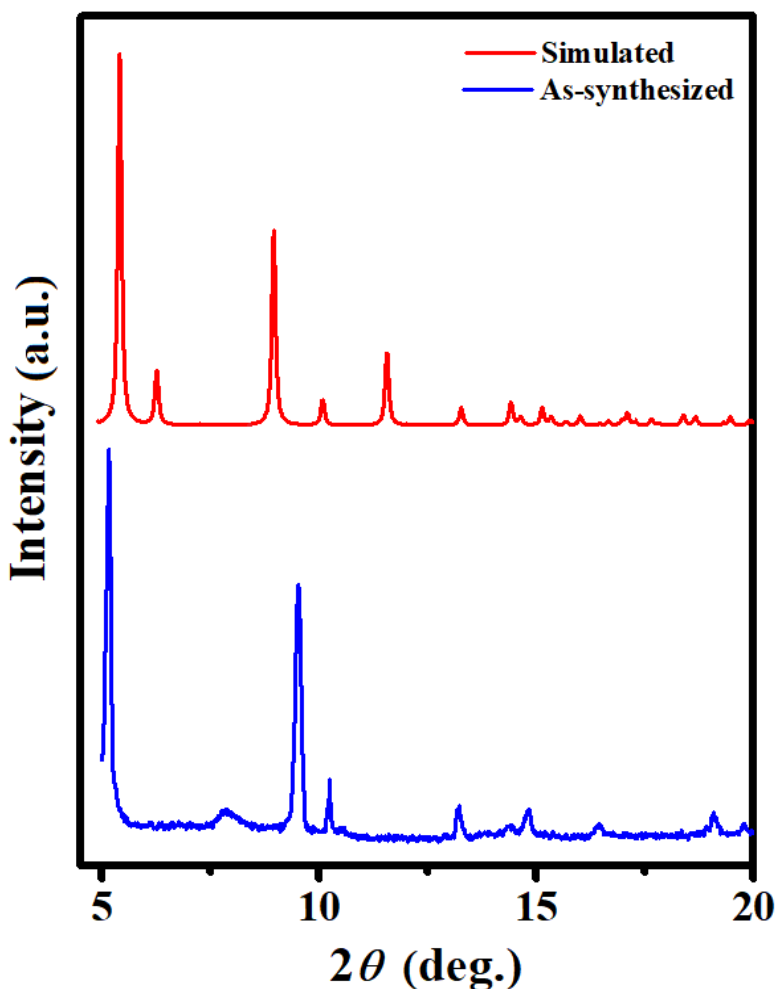


Fig. S1 PXRD pattern of simulated and as-synthesized Zn-5ASA_NDI-MOF.

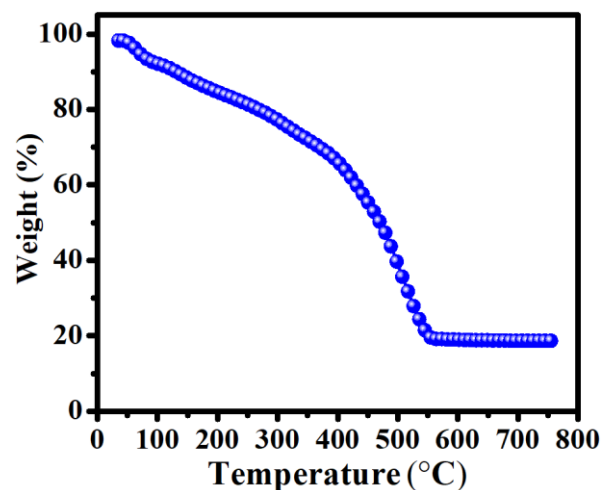


Fig. S2 TGA graph of Zn-5ASA_NDI-MOF.

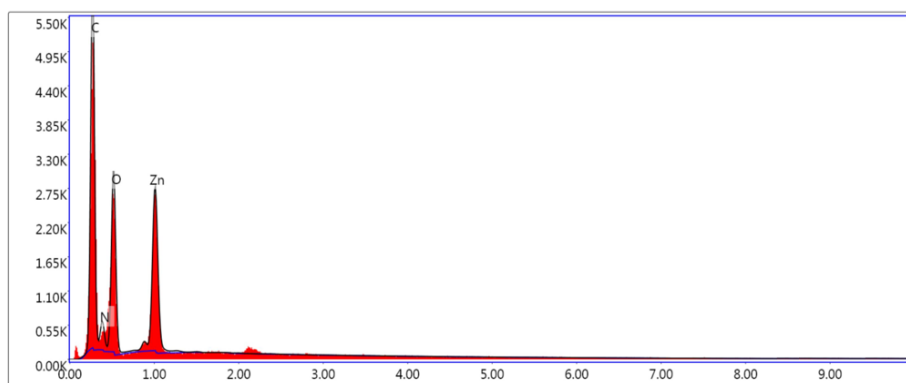


Fig. S3 EDX spectra of Zn-5ASA_NDI-MOF.

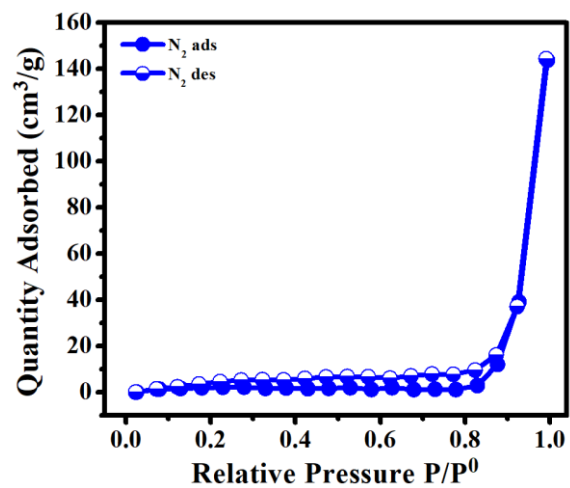


Fig. S4 N₂ adsorption-desorption property of hexagonal porous Zn-5ASA_NDI-MOF rods at 77K.

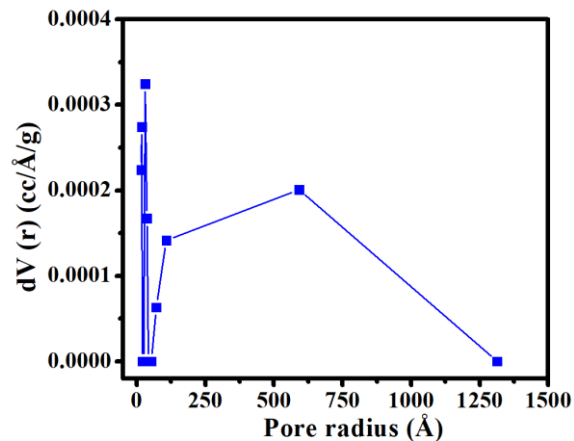


Fig. S5 Pore size distribution of Zn-5ASA_NDI-MOF.

Table S1. Summary of EDX data of Zn-5ASA_NDI-MOF.

Element	Weight%	Atomic%
C	43.84	58.68
N	7.88	9.05
O	26.86	27.00
Zn	21.42	5.27

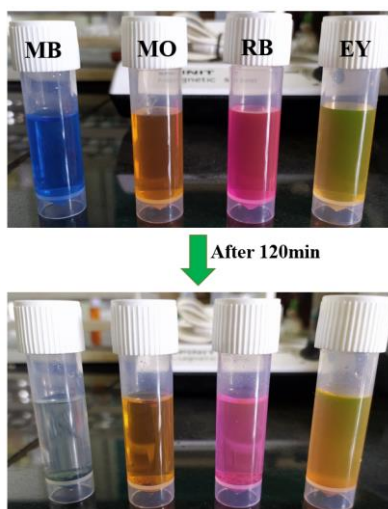


Fig. S6 Selective adsorption of MB dye as compared to MO, RB and EY on Zn-5ASA_NDI-MOF after 120min of adsorption.

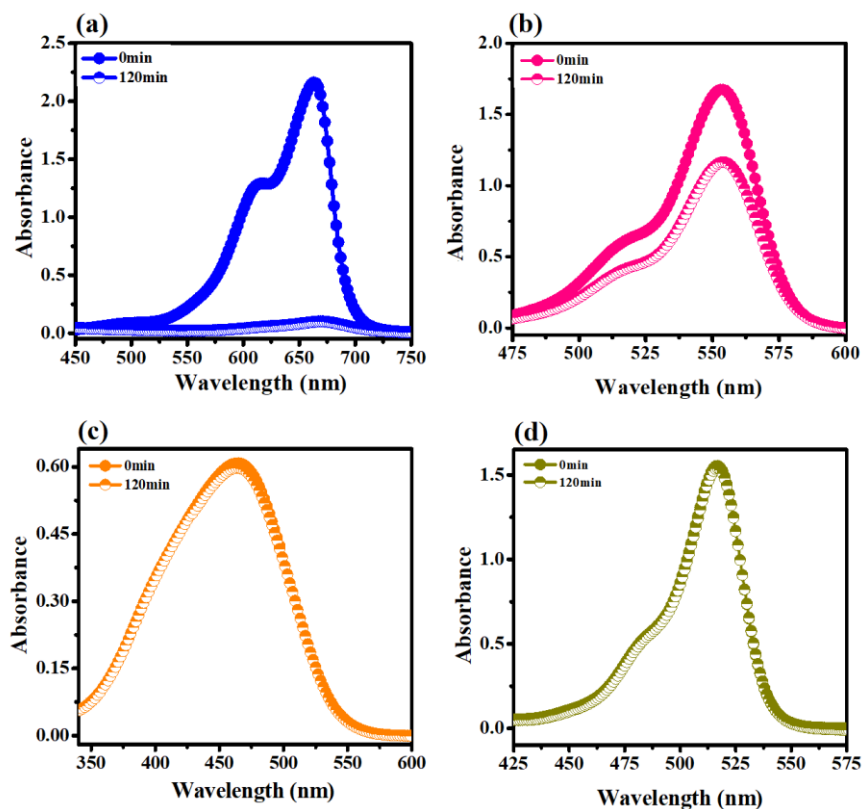


Fig. S7 Adsorption study of different water soluble dyes viz. MB(a), RB(b), MO(c), EY(d) on porous Zn-5ASA_NDI-MOF upto 120min.

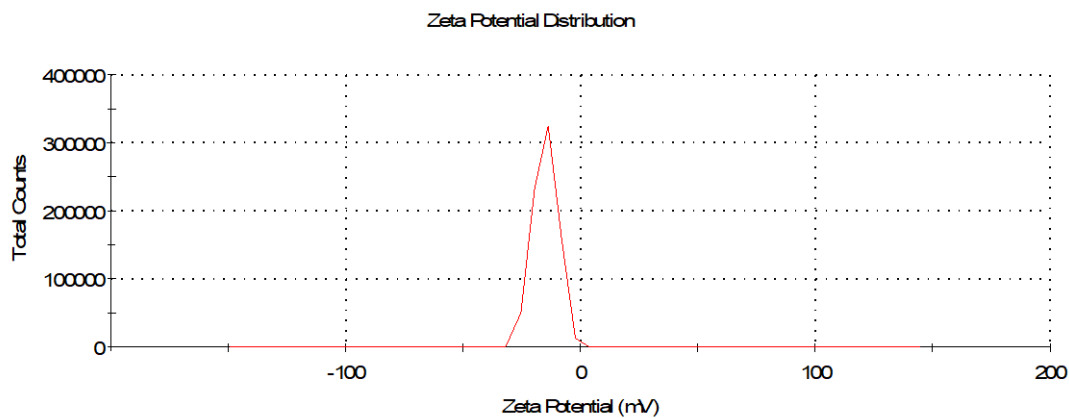


Fig. S8 Zeta Potential profile of synthesized hexagonal porous MOF rods.

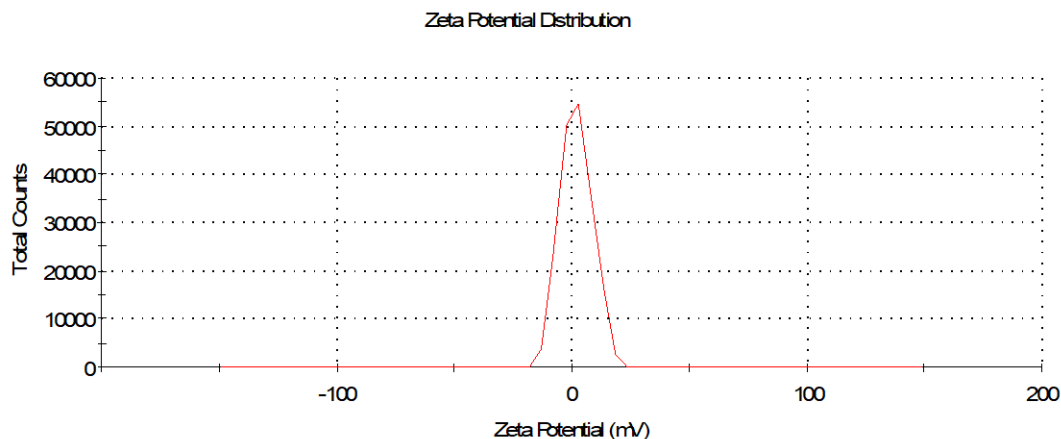


Fig. S9 Zeta Potential profile of dye adsorbed hexagonal porous MOF rods.

Table S2. A comparative study of the MOF showing multi adsorption behaviour.

MOF used	CO ₂ uptake (cm ³ /g) (Temperature /Pressure used)	Selectivity with other gases	Dye adsorption capacity (mg/g) (Amount/Concentration used/Time taken)	Selectivity with other dyes	References
<i>Hexagonal porous Zn-5ASA_NDI-MOF rods</i>	<i>21.2465 (298K, 1bar)</i>	<i>Yes</i>	<i>2.47 (10mg, 5ppm, 120min)</i>	<i>Yes</i>	<i>Present work</i>
Doubly Interpenetrated MOF with [Zn ₄ O] Clusters and Its Doped Isomorphic MOF	13.5 (298K, 1bar)	Yes	Not reported	Not reported	<i>Cryst. Growth Des.</i> 2017, 17 , 3965-3973.
3D-porous Mn(II)-based metal-organic framework [Mn ₄ (L) ₂ (H ₂ O) ₄] _n ·4DMF·H ₂ O	30.8 (298 K)	Yes	16-26 (5mg, 50 ppm ethanolic solution of dye, 120min)	No (Three different organic dye adsorption is reported simultaneously without complete removal of dye molecule)	<i>Dalton Trans.</i> , 2019, 48 , 7612-7618

Bimetallic cationic metal-organic frameworks (PFC-24-Zr)	13.70 (298 K)	Not reported	8-12 (10 mg, 3 ppm, 1440min)	Yes (without complete removal of dye)	<i>Cryst. Growth Des.</i> 2020, 20 , 4861-4866
Mesoporous CZJ-10 MOF	16.30 (298 K, 1atm)	Yes	Not reported	Not reported	<i>Cryst. Growth Des.</i> 2017, 17 , 2688-2693.