Electronic Supplementary Information

Ni-MOF based luminescent sensor for selective and rapid sensing of Fe (II) and Fe(III) ions

Ekta P. Asiwal, Divyesh S. Shelar, Chaturvedi S. Gujja, Sudesh T. Manjare, and Suresh D. Pawar.*

Department of Chemistry, University of Mumbai, Santacruz (E), Mumbai-400098, India.

*E-mail:sureshpawar@chemistry.mu.ac.in

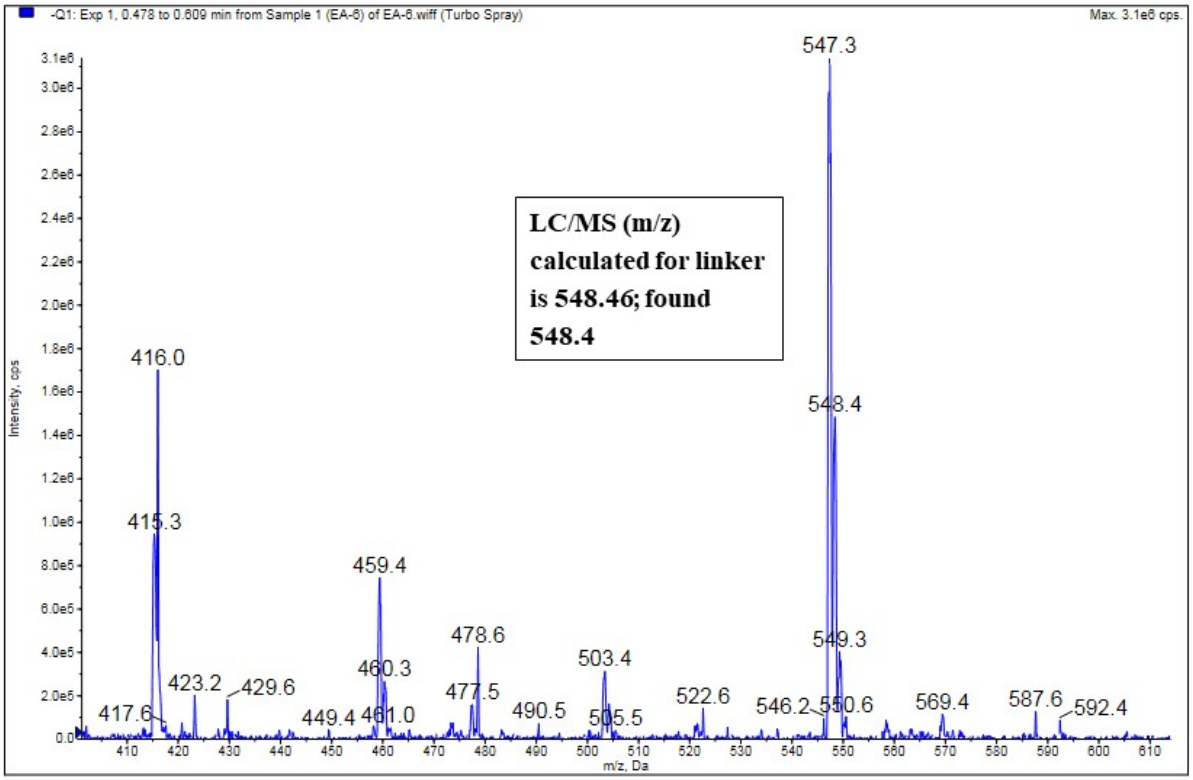

Fig. S1 LC-MS (m/z) of linkerbis (N, N-trimellitoyl)-4,4'-oxydianiline.

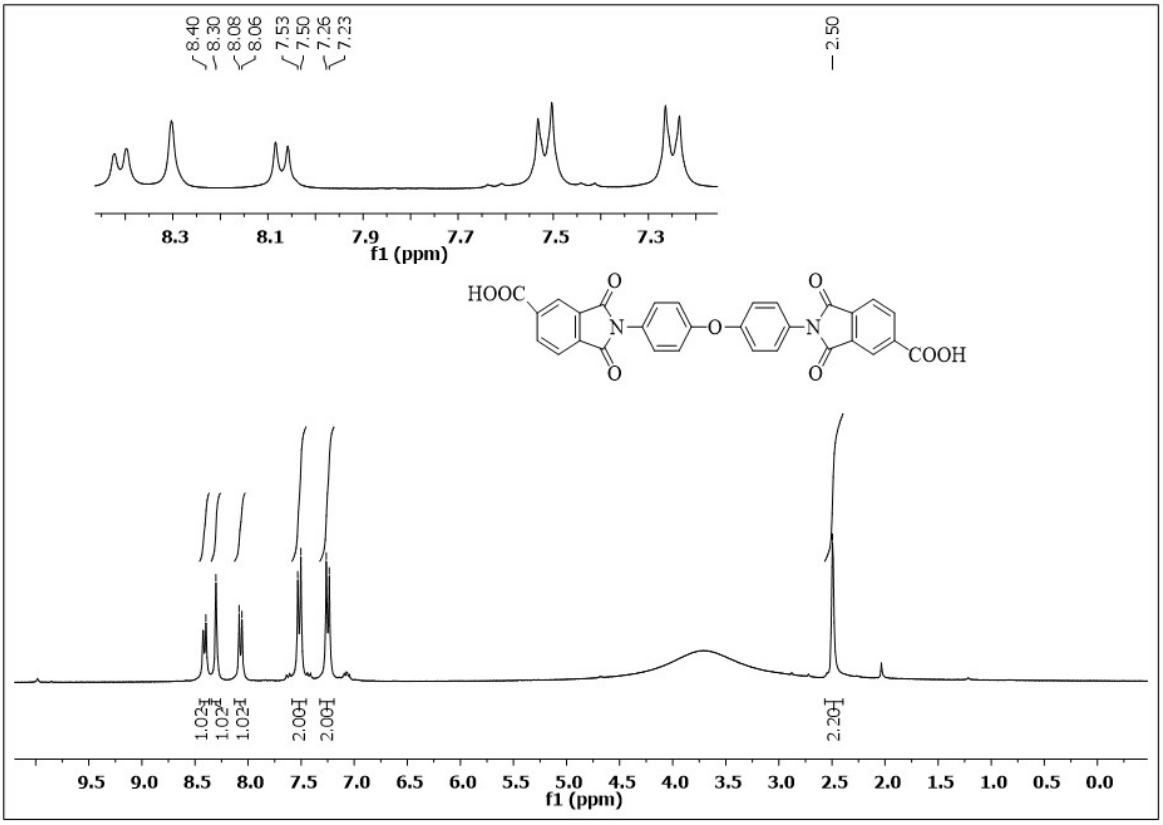

Fig. S2[1]H-NMR of linker bis(N,N-trimellitoyl)-4,4'-oxydianiline.

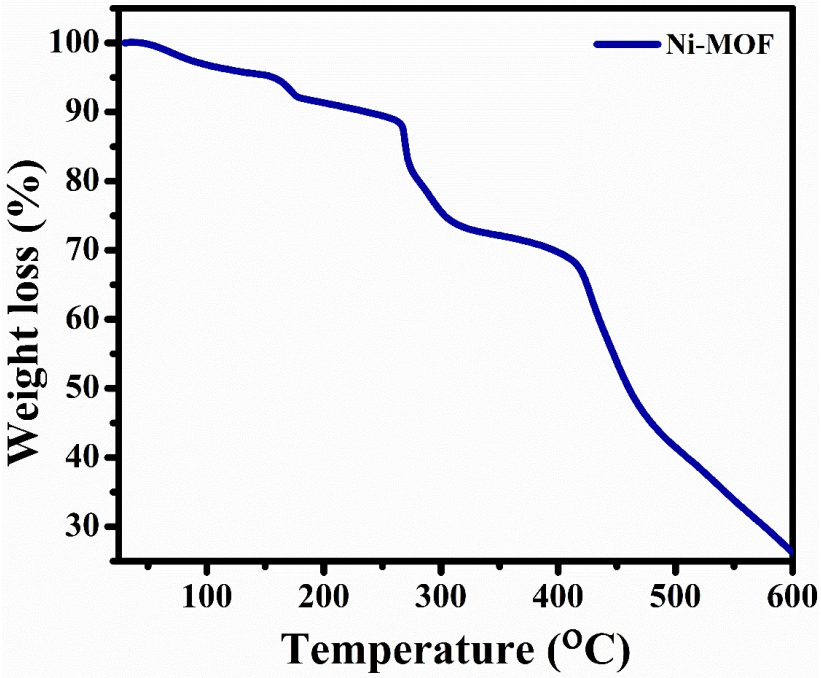

Fig. S3 Thermogravimetry (TGA) analysis of Ni-MOF.

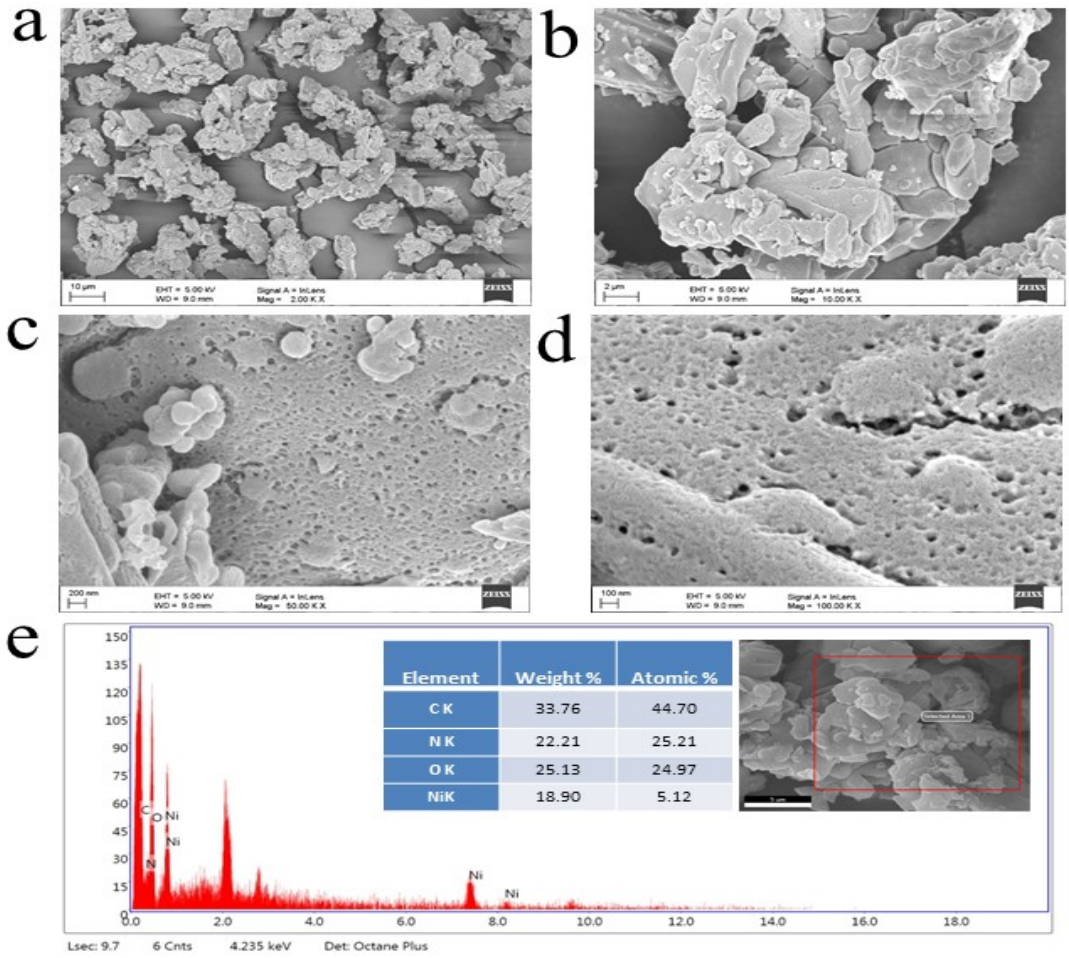

Fig. S4 (a), (b), (c), (d) FE-SEM images of Ni-MOF at different magnification of 10 µm, 2 µm, 200nm, 100nm respectively and; (e) EDAX spectrum of Ni-MOF.

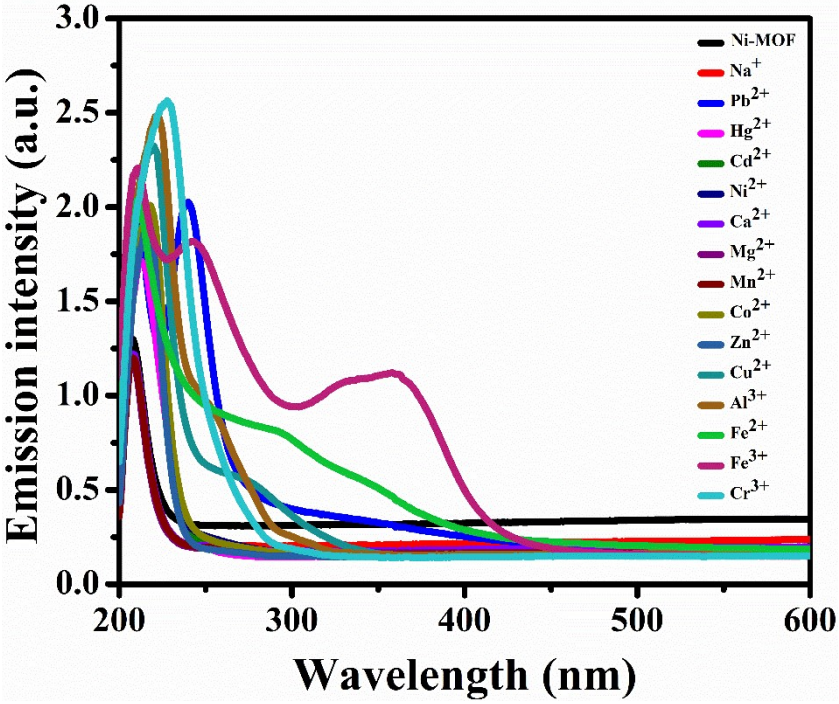

Fig. S5 UV-vis spectra of Ni-MOF and Ni-MOF with different metal ions.

Limit of Detection (LOD)

The detection limit was calculated by titrating increasing concentration of Fe (II)/Fe (III) (0-500 μM) with Ni-MOF. The readings of blank (Ni-MOF) were recorded to calculate standard deviation.

The LOD was calculated by using the formula;

$$LOD = \frac{3\sigma}{k}$$

Where, σ = standard deviation of Ni-MOF,

k = slope of the linear regression line between the plots of emission intensity vs. concentration of Fe(II)/Fe(III).

Table S1: The results of linear regression line:

	σ	**3×σ**	**k**	**R^2**
Fe^{2+}	7.414916	22.24475	-0.889	0.9105
Fe^{3+}			-1.440	0.9567

Table S2: Sensing capabilities of some reported MOFs towards $Fe^{2+}$and Fe^{3+} in terms of limit of detection (LOD):

MOF	Analytes	LOD (μM)	Medium	References
534-MOF-Tb	Fe^{3+}	130	Water	S1
FJI-C8 (Zn-MOF)	Fe^{3+}	23.3	DMF	S2
$[(CH_3)_2NH_2]\cdot[Tb(bptc)]\cdot 0.4DMF\cdot 3.6H_2O$.	Fe^{3+}	180	Ethanol	S3
NNU-1 (Zn-MOF)	Fe^{3+}	200	Water	S4
$Eu(C_{33}H_{24}O_{12})(H_2NMe)(H_2O)$	Fe^{3+}	200	Water	S5
Ni-MOF	Fe^{2+} Fe^{3+}	25.03 15.44	Ethanol	**This work**

Table S3: N_2 adsorption parameters of the Ni-MOF

PARAMETERS	VALUE
Surface Area	
Single point surface area at P/Po = 0.110030026:	2.2238 m^2/g
BET Surface Area:	2.2669 m^2/g
Langmuir Surface Area:	0.7629 m^2/g
t-Plot Micropore Area:	6.8160 m^2/g
t-Plot external surface area:	-4.5491 m^2/g
BJH Adsorption cumulative surface area of poresbetween 10.000 Å and 500.000 Å diameter:	4.9384 m^2/g
Pore Volume	
t-Plot micropore volume:	0.002638 cm^3/g
BJH Adsorption cumulative volume of pores between 10.000 Å and 500.000 Å diameter:	0.001282 cm^3/g
Pore Size	
BJH Adsorption average pore diameter (4V/A):	10.388 Å

References

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S3 X. L. Zhao, D. Tian, Q. Gao, H. W. Sun, J. Xu and X. H. Bu, *Dalton Transactions*, 2016, **45**, 1040.

S4B. L. Hou, D. Tian, J. Liu, L. Z. Dong, S. L. Li, D. S. Li and Y. Q. Lan, *Inorganic Chemistry*, 2016, **55**, 10580.

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