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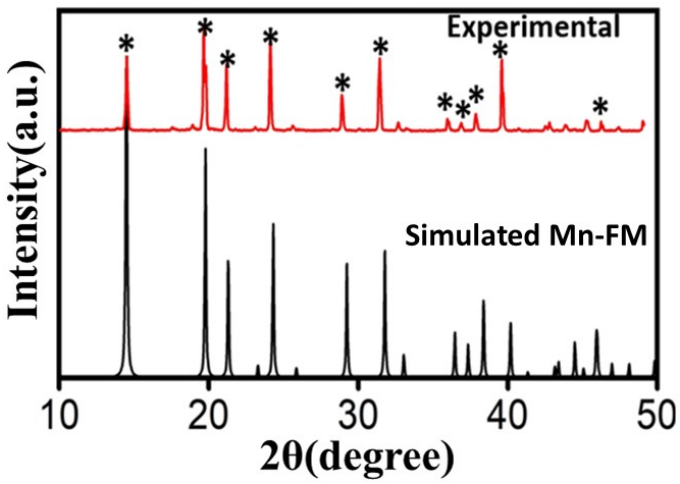

Fig **S1**: PXRD of **Mn-FM**; simulated (black) and experimental (red).

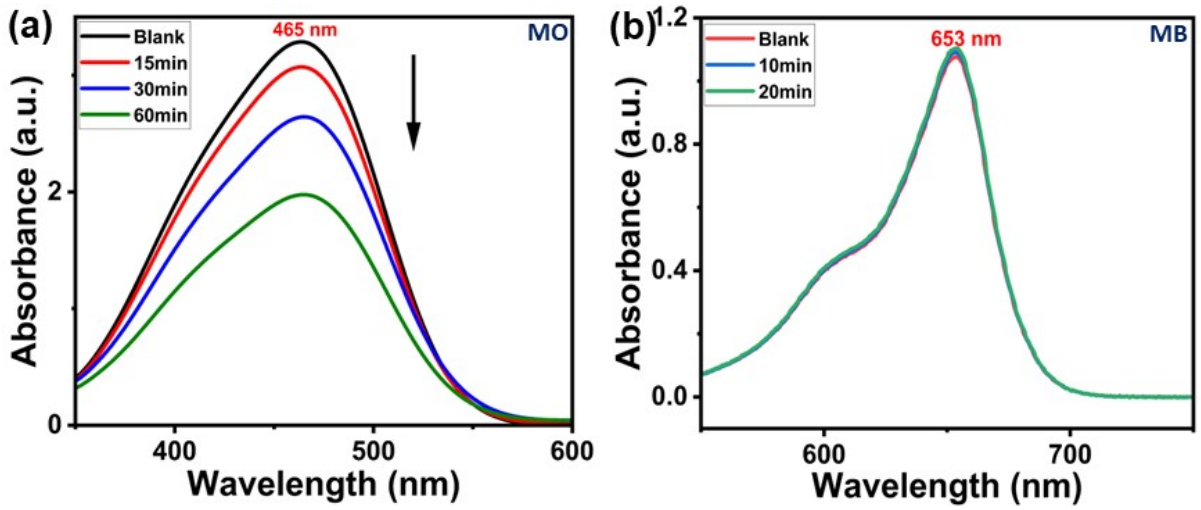

Fig **S2**: Absorption spectra of (a) methyl orange (MO) and (b) methylene blue (MB) in presence of **Mn-FM** adsorbent.

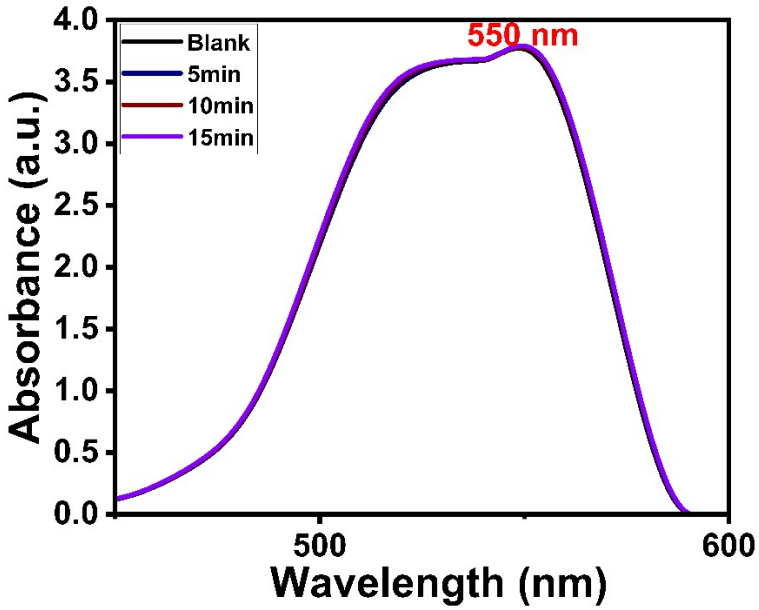

Fig **S3**: Absorption spectra of Rhodamine B (RhB) in presence of **Mn-FM** adsorbent.

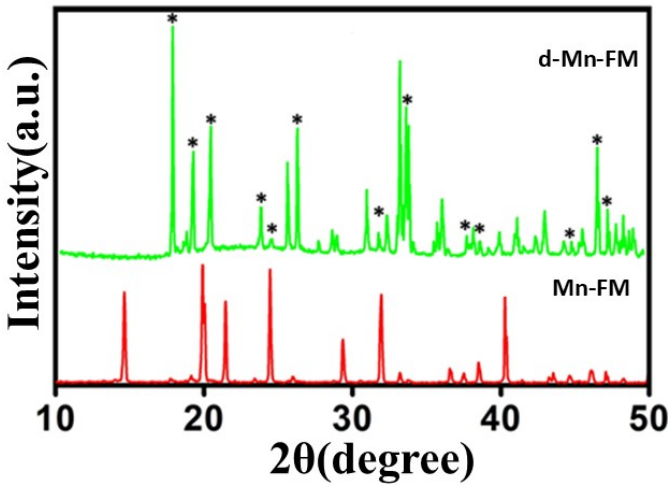

Fig **S4**: PXRD of **Mn-FM** (red line) and **d-Mn-FM** (green line).

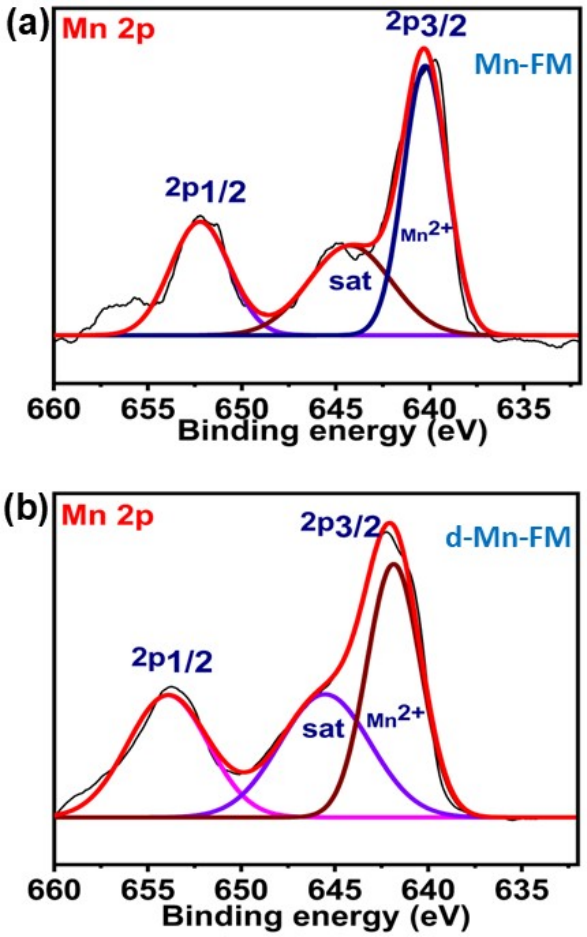

Fig **S5**: XPS patterns of (a) **Mn-FM** and (b) d-**Mn-FM** MOFs.

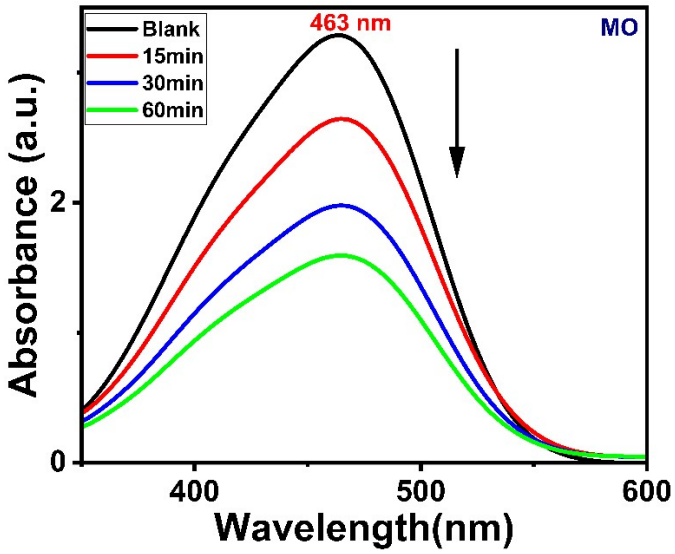

Fig **S6**: MO (15 ppm in methanol) adsorption spectra for **d-Mn-FM** (20 mg).

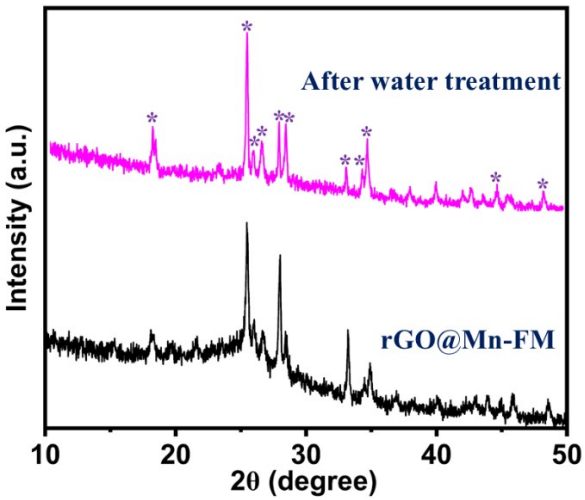

Fig **S7**: PXRD spectra of **rGO@Mn-FM** composite after treatment with water.

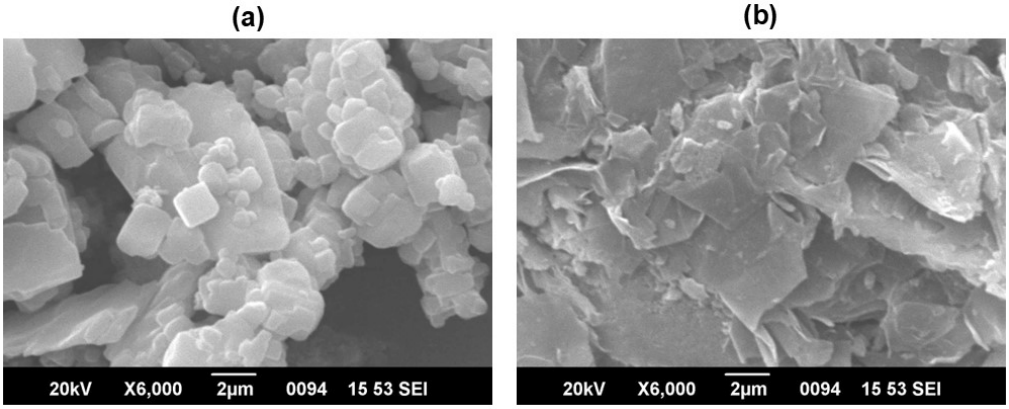

Fig **S8**: SEM image of (a) **Mn-FM** and (b) **rGO@Mn-FM** composite.

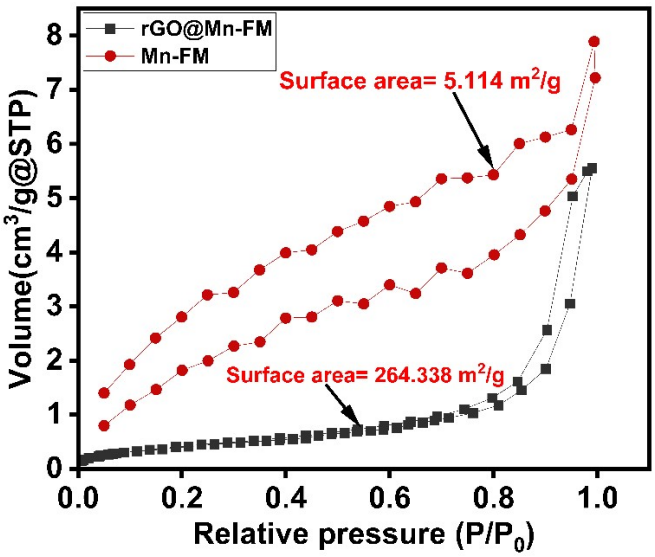

Fig **S9**: Nitrogen adsorption-desorption isotherm of **Mn-FM** (brown line) and **rGO@Mn-FM** (black line).

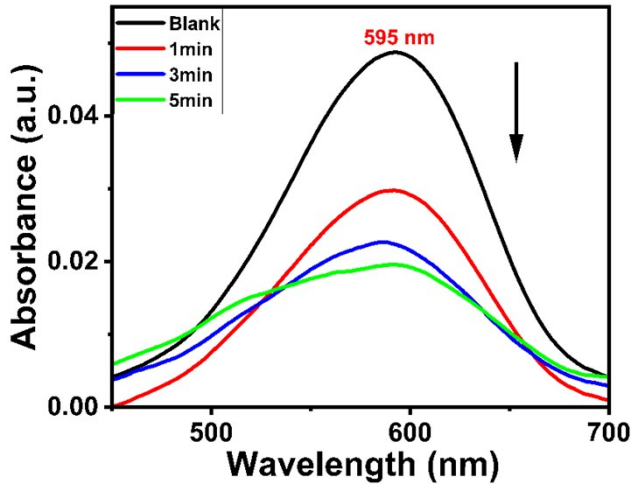

Fig **S10**: Absorption spectra of 1 ppm aqueous MeB solution in presence of **rGO@Mn-FM** adsorbent.

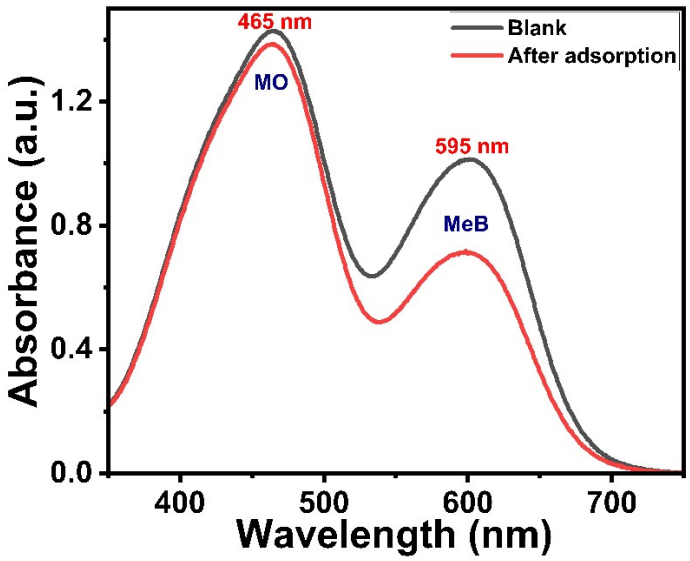

Fig **S11**: Absorption spectra for dye mixture (MeB/MO) in presence of **rGO@Mn-FM**.

Kinetic equation for the adsorption of dye

The pseudo-first-order (PFO) kinetic model equation is

$log(q_e - q_t) = logq_e - k_1\, t/2.303$

where k_1 (min^{-1}) is the rate constant of the pseudo-first-order reaction, q_e is the adsorption capacity (mg/g) at equilibrium, q_t is the adsorption capacity (mg/g) at time (min).[14]

The Pseudo-second order (PSO) kinetic model equation is as follows

$$t/q_t = 1/(k_2\, q_e^2\,) + t/q_e$$

Where, k_2 (g/mg min^{-1}) is the rate constant for pseudo-second-order kinetic model.

Isotherm models for the adsorption of dye

Langmuir isotherm model

Langmuir model is described by the following equation;

$$\frac{C_e}{q_e} = \frac{1}{q_m.K_L} + \frac{C_e}{q_m}$$

Where, q_m denotes the maximum amount of dye adsorbed per unit mass of adsorbent, q_e denotes the amount of dye per unit mass of adsorbent at equilibrium (mg/g). K_L denotes the Langmuir constant and C_e denotes the equilibrium concentration of adsorbate in solution (mg/L).

Dimensionless constant (R_L) is calculated by using the following equation:

$R_L = 1/(1 + K_L C_o)$

R_L factor is used to determine the favorability of dye adsorption onto adsorbent surface. For linear favorable adsorption ($0 < R_L < 1$), unfavorable ($R_L > 1$), linear ($R_L = 1$) and irreversible ($R_L = 0$).[15]

Freundlich isotherm model

The Freundlich isotherm model is represented by the equation:

$$lnq_e = lnK_F + \left(\frac{1}{n_F}\right) lnC_e$$

where, K_F and n_F are Freundlich isotherm constant; K_F describes adsorption extent and n_F is heterogeneity factor. The K_F and n_F values are calculated by equations:

$$Intercept = lnK_F \qquad n_F = 1/slope$$

If $n_F > 1$, then favorable adsorption, if $n_F < 1$ then chemisorption and $n_F = 1$ then linear adsorption.[16]

Table **S1**: List of dye removal rate of some of the reported MOFs

Dye	MOFs/ Composites	Removal rate	Time (minute)	Ref.
Methylene blue	Fe_3O_4@MIL-100(Fe)	73.8	420	1
	MIL-100(Fe)	27	30	2
	USTC-1	26.6	240	3
	CuBDC	41.01	20	4
Methyl orange	UiO-66	83.7	120	5
	$H_6P_2W_{18}O_{62}$/MOF-5	10	10	6
Rhodamine B	MIL-125(Ti)	59.92	180	7
	Zn-MOF	3.75	60	8
	$H_6P_2W_{18}O_{62}$/MOF-5	68	10	9
	MIL-68(In)–NH_2	50	60	10
Reactive black 5	MIL-125(Ti)	60	180	11
Acid blue 92	UiO-66	73	40	12
Direct red 2B	UiO-66	76	40	12
Maxilon blue M2G	UiO-66	46.6	40	12
Orange G	POM@UiO-66	40	120	13

Table **S2**: Water characterisations table

Water Properties	Distilled water	Pond water
Alkalinity	**31.2 mg/L**	**215.2 mg/L**
Hardness	**9.7 mg/L**	**41 mg/L**
TDS	**2 ppm**	**164 ppm**
Turbidity	**0 NTU**	**25 NTU**

Table **S3**: Crystallographic table

Compound No.	**Mn-FM**
Formulae	$C_{15}H_{15}Mn_3N_9O_{18}$

Mol. wt.	774.18
CCDC No	2263898
Crystal system	Trigonal
Space group	*R-3c*
Temperature (K)	298 (2)
Wavelength (Å)	0.71073
a (Å)	8.3840(16)
b (Å)	8.3840(16)
c (Å)	23.021(6)
α (°)	90.00
β (°)	90.00
γ (°)	120.00
V ($Å^3$)	1295.50(17)
Z	2
Density/gcm^{-3}	1.897
Abs. Coeff. /mm^{-1}	1.428
Abs. correction	none
F(000)	768
Total no. of reflections	279
Reflections, $I > 2\sigma(I)$	277
Max. 2θ (°)	25.24
Ranges (h, k, l)	$-10 \leq h \leq 10$ $-10 \leq k \leq 10$ $-27 \leq l \leq 27$
Completeness to 2θ (%)	0.976
Data/ Restraints / Parameters	279/0/ 28
Goof (F^2)	1.262
R indices [$I > 2\sigma(I)$]	0.0729
R indices (all data)	0.0730

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