

Supplementary data

Microbial preparation of magnetite/reduced graphene oxide nanocomposite for
removal of organic dyes from aqueous solutions

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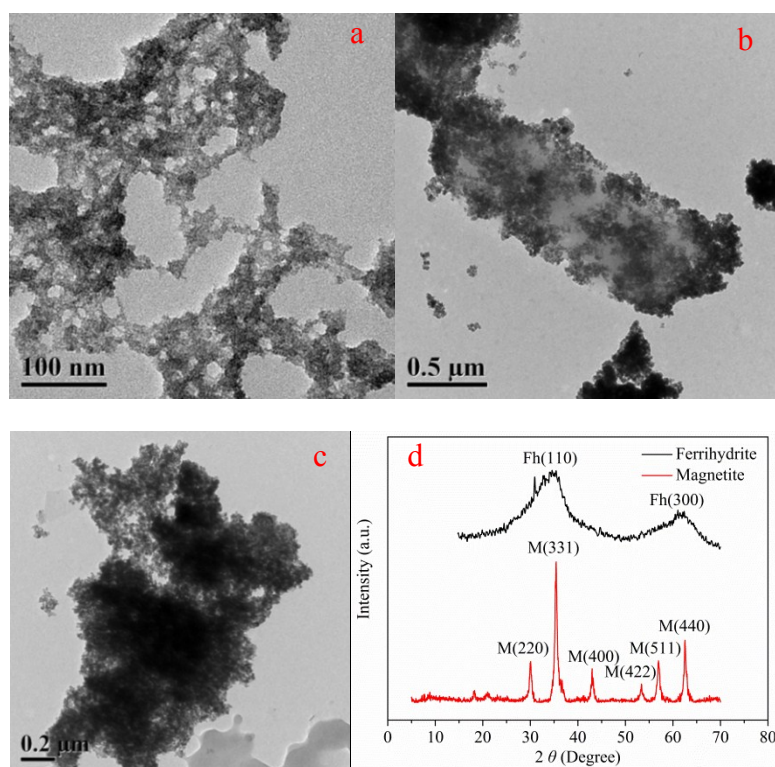


Fig. S1 TEM images of ferrihydrite before (a) and after (b, c) reduction by MR-1; and XRD of ferrihydrite and its reduction product by MR-1 (d). Fh, ferrihydrite, M: magnetite.

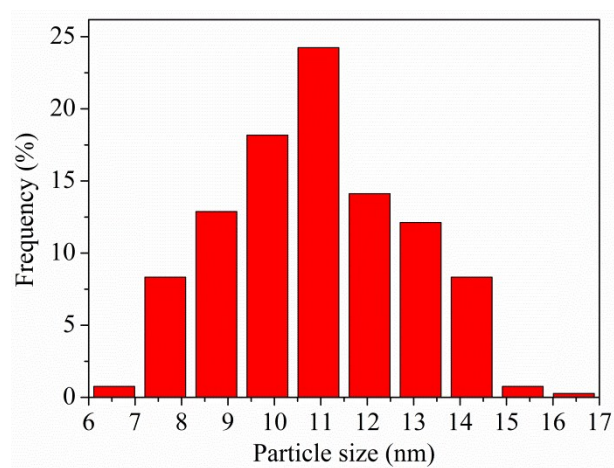


Fig. S2 The particle size distribution of magnetite nanoparticles on MRGO.

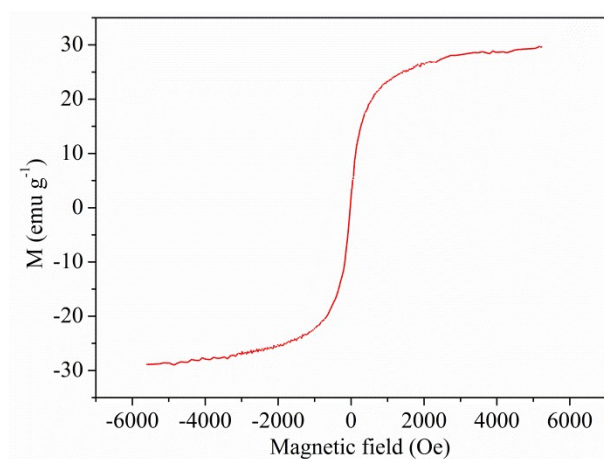


Fig. S3 Magnetization curve of MRGO.

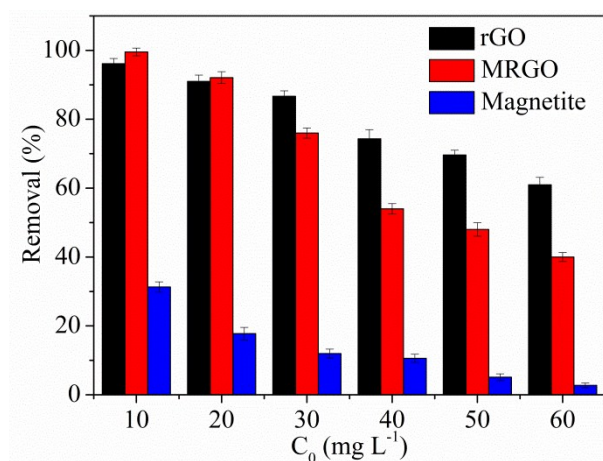


Fig. S4 Adsorptive removal of MB by MRGO, biosynthesized rGO and magnetite. Contact time: 40 min; MRGO, rGO and magnetite dosage: 0.17 g L⁻¹; pH = 6.0.

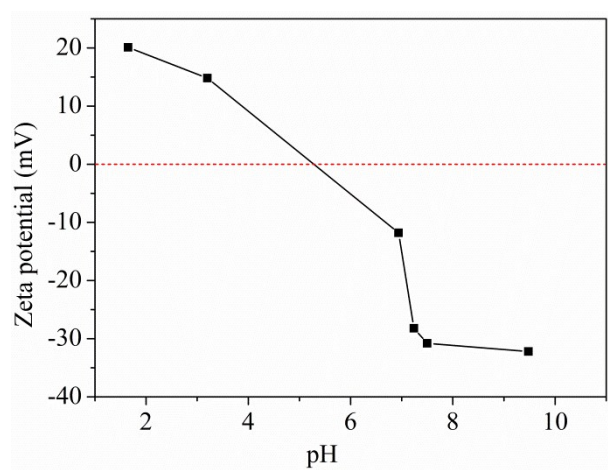


Fig. S5 Zeta potential of MRGO at various pH values.

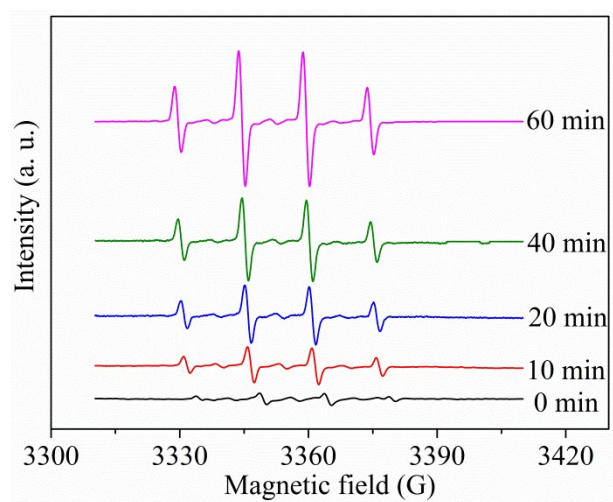


Fig. S6 Time-course ESR spectra of DMPO- $\cdot$ OH adducts revealing the continuous generation of hydroxyl radical in the presence of MRGO and H_2O_2 .

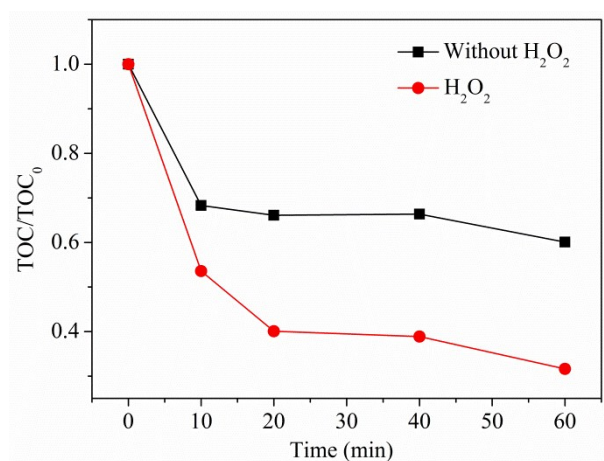


Fig. S7 TOC changes of 30 mg L⁻¹ MB solution containing 0.17 g L⁻¹ MRGO in the presence or absence of 5 mL 30% H₂O₂.

Table S1 Effects of initial pH on adsorptive removal of dye by various magnetic graphene-based adsorbents.

Adsorbent	Adsorbent concentration (g L ⁻¹)	Dye species and concentration (mg L ⁻¹)	pH	Removal (%)	Refs.
G/magnetite	0.4	MB (15)	2-11	40-93.3	[1]
Magnetic/GO	1	MB (90)	3-10	55-94	[2]
Magnetic β -cyclodextrin-chitosan/GO	0.4	MB (100)	2-11	18-95	[3]
Magnetite/rGO	0.234	GR (5)	4-10	68-75	[4]
Magnetic citric-acid-functionalized GO	1	MB (20)	2-10	65-92	[5]
MRGO	0.17	MB (30)	4-10	48-93	This work

Table S2 Effects of ionic strength on adsorption removal of MB by various graphene-based adsorbents.

Adsorbent	MB concentration (mg L ⁻¹)	Ionic strength (M)	Effects on dye removal	Refs.
Rhamnolipid-functionalized graphene oxide	100/200	0.12 (NaCl)	No	[6]
Magnetic polysaccharide- GO	140	0.1 (NaCl)	25% decrease	[7]
GO	330	0.05 (KCl)	No	[8]
GO	125/250/500	0.1 (NaCl)	No/No/26% decrease	[9]
MRGO	10/30/50	1 (NaCl)	No/14% decrease/14% decrease	This work

Table S3 Reusability of various magnetic graphene-based adsorbents for MB.

Adsorbent	Regeneration method	Cycles	Removal efficiency of the 1st and last adsorption cycle	Refs.
G/magnetite	Absolute ethanol wash	1-5	40%, 27%	[1]
Magnetite/GO	Absolute ethylene glycol wash	1-3	55.76%, 42.25%	[2]
Magnetic β - cyclodextrin -chitosan/GO	Absolute ethanol wash	1-5	50%, 38%	[3]
magnetic chitosan graphene oxide	0.5 mol/L NaOH wash	1-5	90%, 75%	[10]
MRGO	5 mL 30% H ₂ O ₂ wash	1-5	98%, 60%	This work

References

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