Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

One-step hydrothermal synthesis of hydrophilic Fe_3O_4/carbon compositions and their application in removing toxic chemicals

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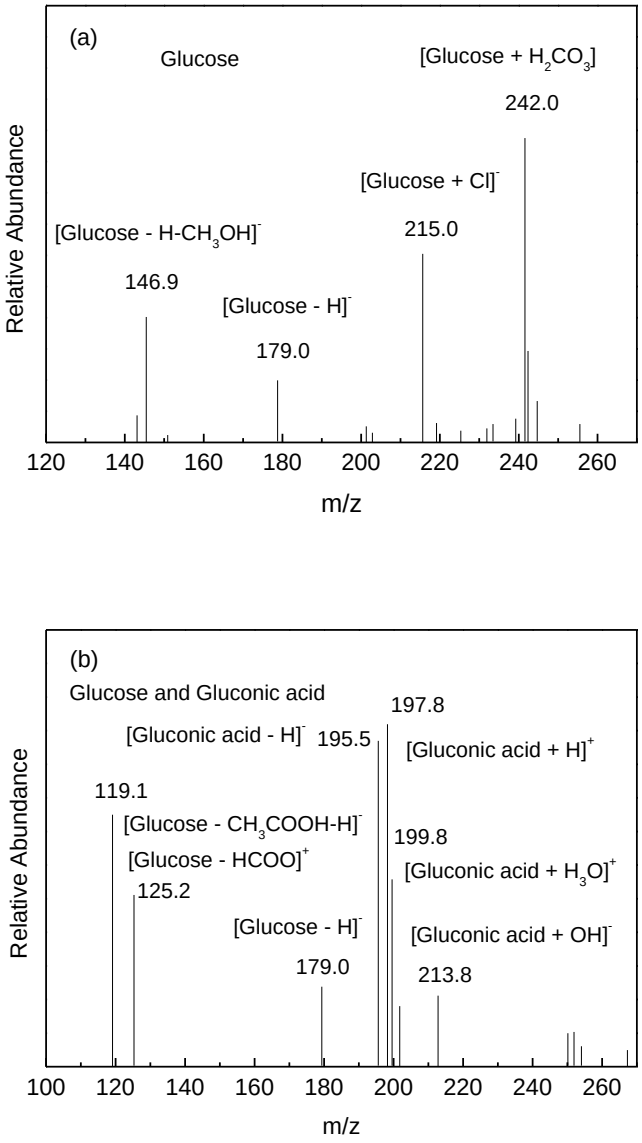


Figure S1. The mass spectrometry (MS) of raw glucose (a) and organic remainders (glucose and gluconic acid) of the reaction solution (b) for Fe_3O_4/C-b.

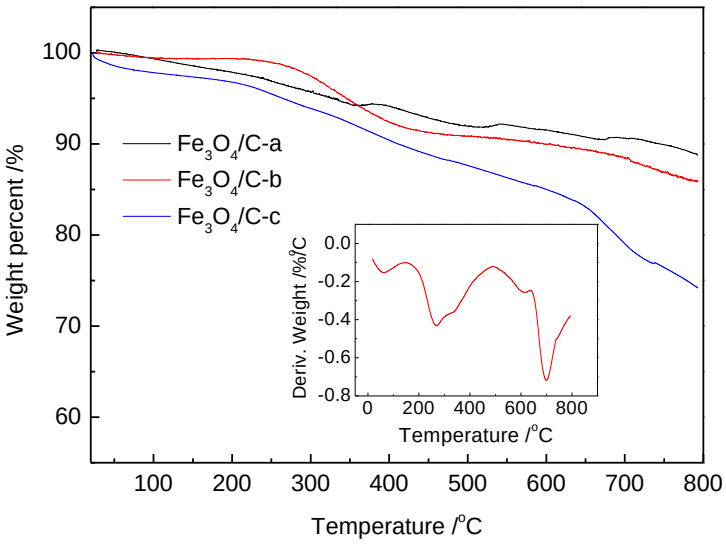


Figure S2. TGA curves of the synthesized magnetite nanoparticles Fe_3O_4/C-a, Fe_3O_4/C-b and Fe_3O_4/C-c (inset: the DTG curve of sample Fe_3O_4/C-b).

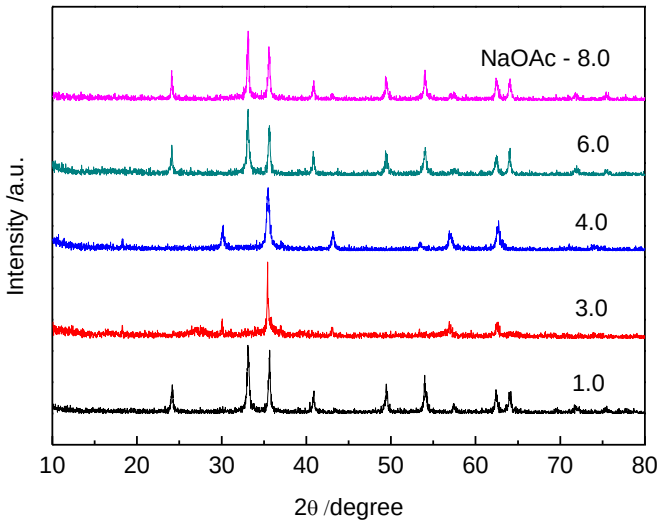


Figure S3. XRD patterns of iron oxide samples obtained by using different amount of NaOAc.

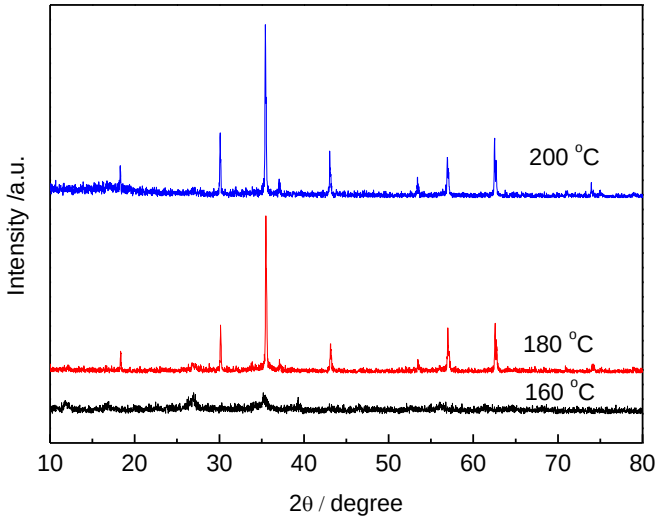


Figure S4. XRD patterns of iron oxide samples obtained by different hydrothermal reaction temperature.

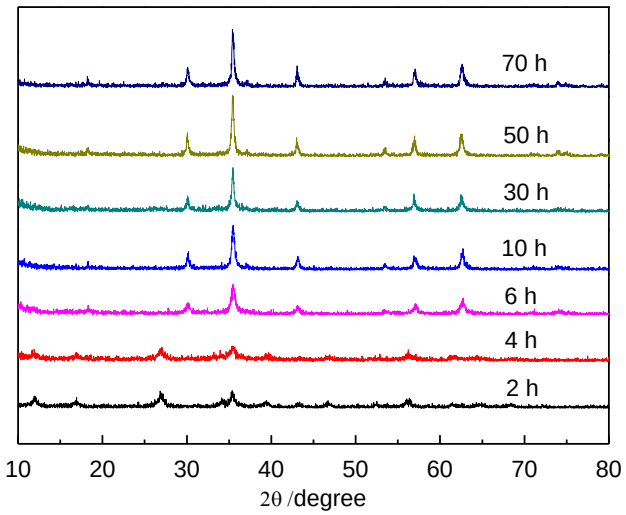
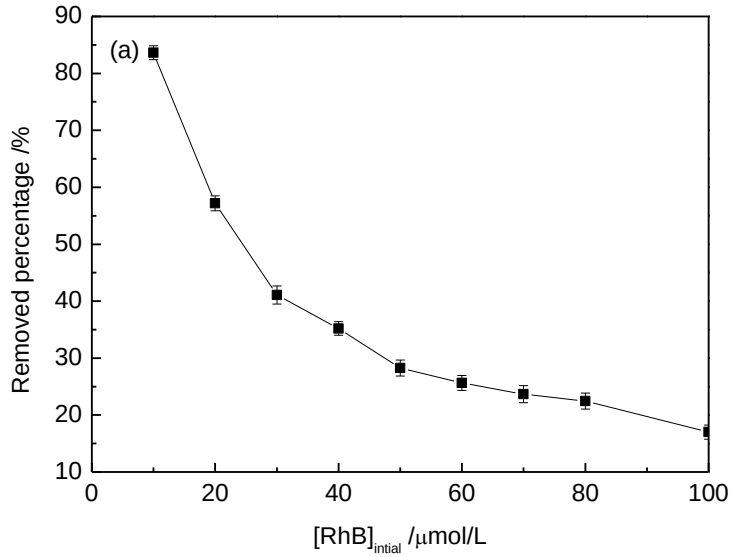
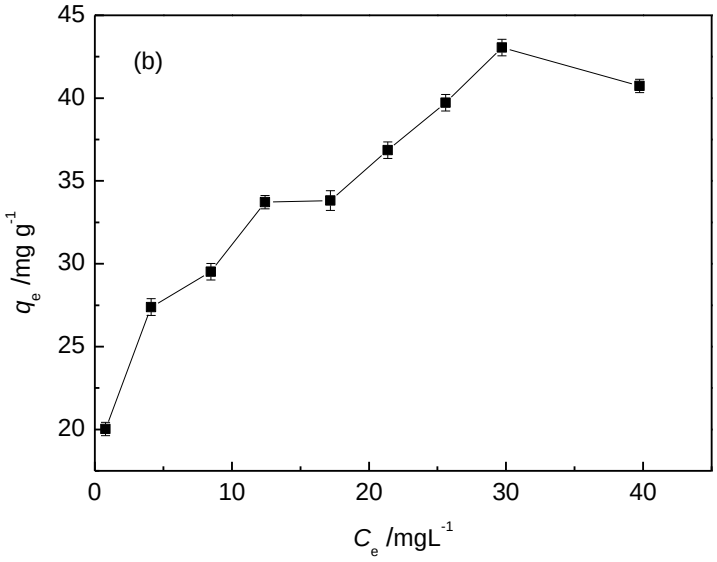


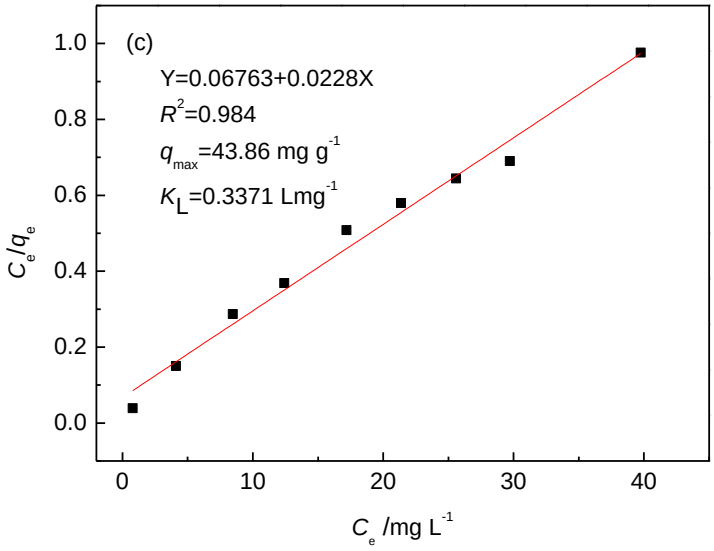
Figure S5. XRD patterns of iron oxide samples obtained by different reaction time.

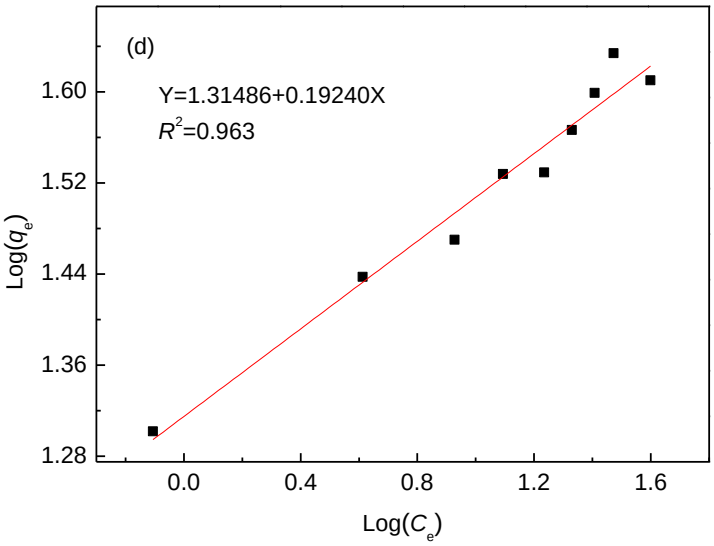
Table S1. The factors influencing the formation of Fe_3O_4/C particles.

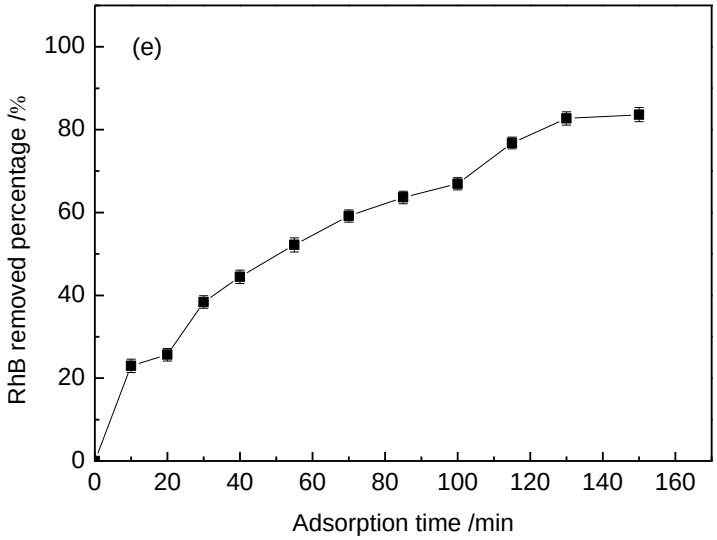
Factors	$FeCl_3$/g	$C_6H_{12}O_6$/g	NaOAc/g	T/℃	Crystallization time/h	product
$C_6H_{12}O_6$	1.6	0.3	4	200	10	magnetite
	1.6	0.6	4	200	10	magnetite
	1.6	1.1	4	200	10	magnetite
NaOAc	1.6	0.6	1	200	10	hematite
	1.6	0.6	3	200	10	magnetite
	1.6	0.6	4	200	10	magnetite
	1.6	0.6	6	200	10	hematite
	1.6	0.6	8	200	10	hematite
Temperature	1.6	0.6	4	160	10	hematite
	1.6	0.6	4	180	10	magnetite
	1.6	0.6	4	200	10	magnetite
Crystallization time	1.6	0.6	4	200	2	hematite
	1.6	0.6	4	200	4	hematite
	1.6	0.6	4	200	6	magnetite
	1.6	0.6	4	200	10	magnetite
	1.6	0.6	4	200	30	magnetite
	1.6	0.6	4	200	50	magnetite
	1.6	0.6	4	200	70	magnetite

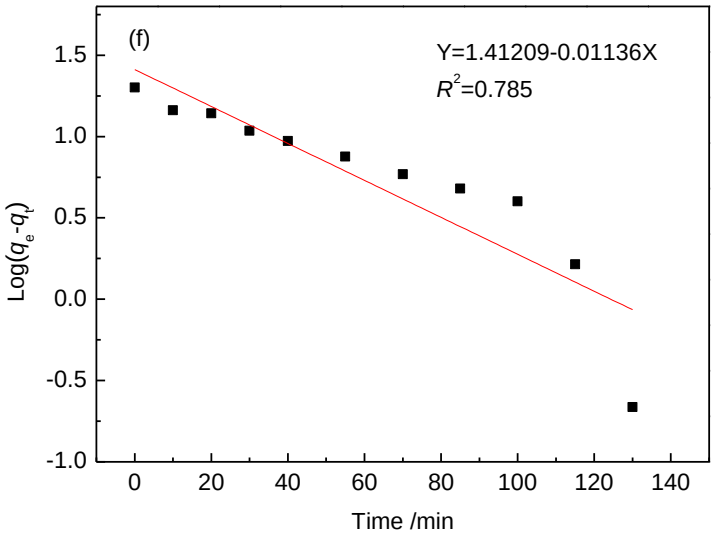

(a)
Removed percentage /%
[RhB]intial /μmol/L
90
80
70
60
50
40
30
20
10
0
20
40
60
80
100


(b)
qe /mg g-1
Ce /mgL-1
45
40
35
30
25
20
0
10
20
30
40


(c)
Y=0.06763+0.0228X
R^2=0.984
q_{max}=43.86 mg g^{-1}
K_L=0.3371 Lmg^{-1}
C_e/q_e
C_e /mg L^{-1}
0.0
0.2
0.4
0.6
0.8
1.0
0
10
20
30
40


(d)
Y=1.31486+0.19240X
R^2=0.963
Log(q_e)
Log(C_e)
1.28
1.36
1.44
1.52
1.60
0.0
0.4
0.8
1.2
1.6


(e)
RhB removed percentage /%
Adsorption time /min
0
20
40
60
80
100
120
140
160


(f)
Y=1.41209-0.01136X
R^2=0.785
Log(q_e-q_t)
Time /min
1.5
1.0
0.5
0.0
-0.5
-1.0
0
20
40
60
80
100
120
140

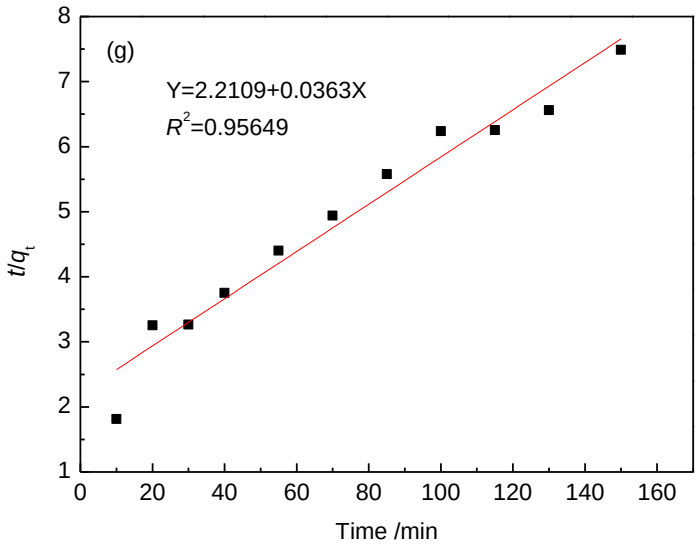


Figure S6. The removed percentage of RhB by as-prepared Fe_3O_4/C-b as a function of the initial concentration (a), the adsorption isotherm for Fe_3O_4/C-b adsorbent (b), the Langmuir (c) and Freundlich (d) isotherms for the adsorption of RhB, the effects of adsorption time for the RhB on the Fe_3O_4/C-b (e), the pseudo-first order adsorption rate equation (f) and the pseudo-second order adsorption rate equation (g).