Electronic Supplementary Information

Natural iron-rich tourmalines as effective catalysts for the heterogeneous and homogeneous activation of HCO_3^-/H_2O_2 to achieve the degradation of typical dyes

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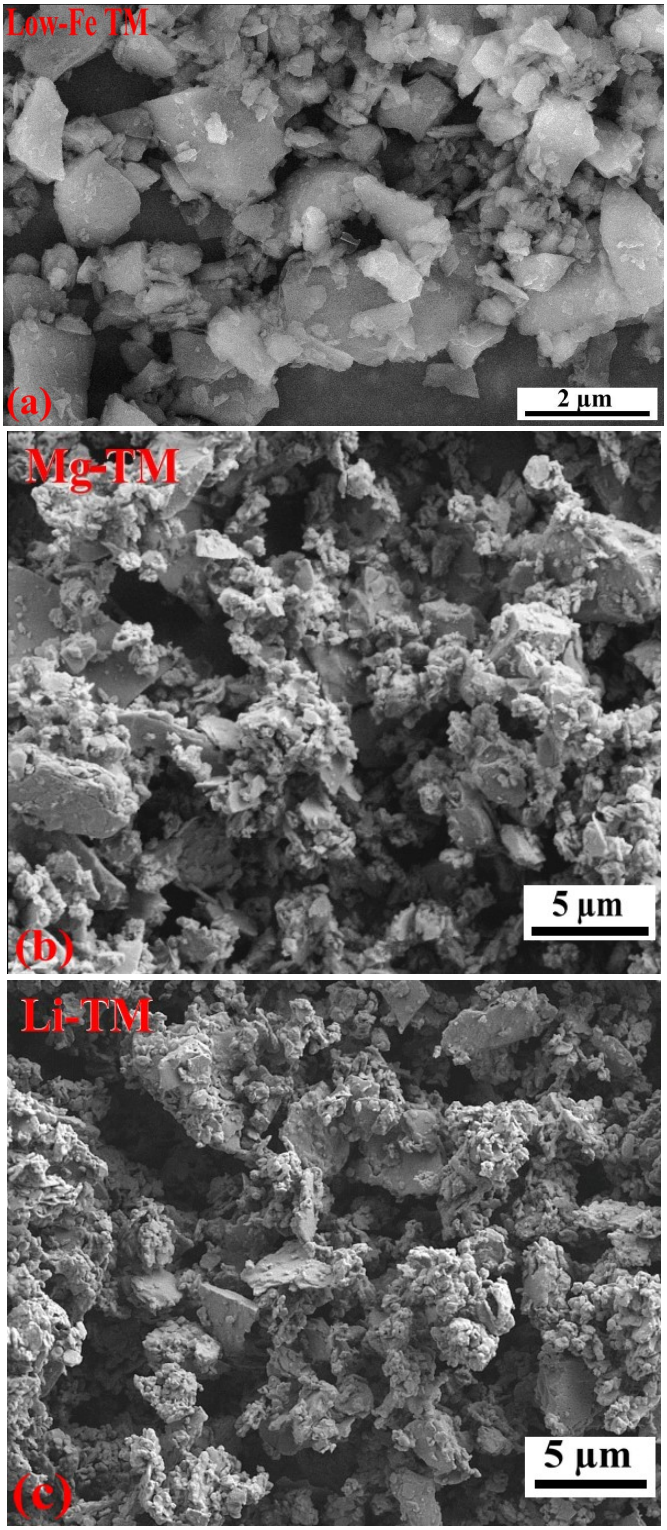

Fig. S1 Typical SEM image of (a) Low-Fe TM, (b) Mg-TM and (c) Li-TM.

Table S1 EDS detecting results of High-Fe TM.

Element	***at.%***	***wt.%***
O	62.11	50.48
Si	13.95	19.90
B	7.18	3.94
C	5.65	3.45
Fe	**4.98**	**14.12**
Mg	3.22	3.98
Na	2.05	2.39
Ca	0.74	1.50
K	0.12	0.24

Table S2 EDS detecting results of Low-Fe TM.

Element	***at.%***	***wt.%***
O	59.11	48.22
C	16.22	9.93
Ca	10.25	20.95
Si	5.89	8.43
B	4.10	2.26
Fe	**2.89**	**8.23**
Na	0.83	0.97
Mg	0.56	0.69
K	0.16	0.32

Table S3 XRF detecting results of Mg-TM.

Oxide species	Content
SiO_2	40.13%
B_2O_3	8.55%
Al_2O_3	40.26%
CaO	0.93%
MgO	8.72%
K_2O	0.50%
Na_2O	1.96%
TiO_2	0.63%
Li_2O	0.006%

Table S4 XRF detecting results of Li-TM

Oxide species	Content
SiO_2	36.72%
B_2O_3	9.72%
Fe_2O_3	4.77%
Al_2O_3	31.08%
CaO	0.99%
MgO	8.71%
Na_2O	1.90%
TiO_2	0.76%
Li_2O	0.30%

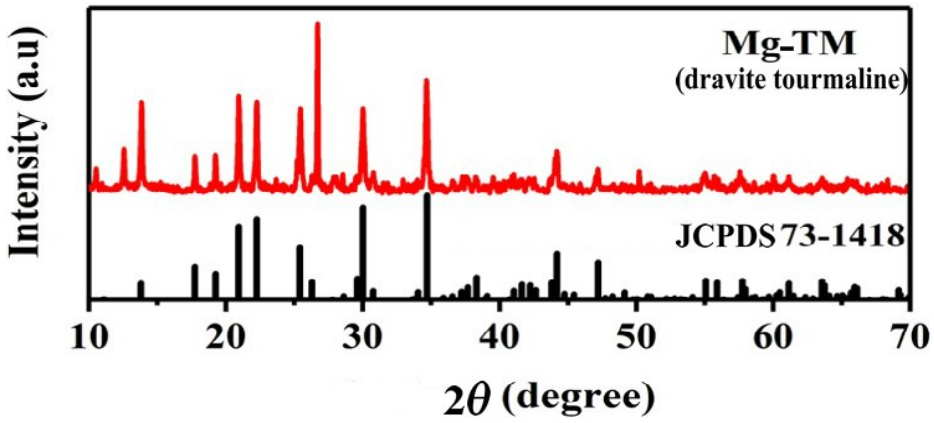

Fig. S2 XRD pattern of Mg-TM.

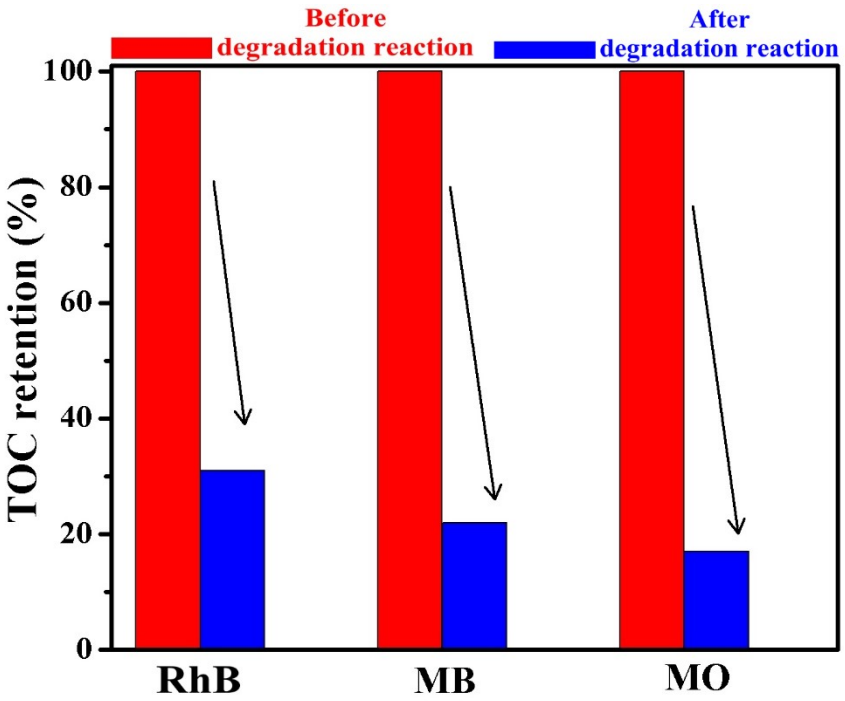

Fig. S3 The TOC retention rate of High-Fe TM/$KHCO_3$/H_2O_2/dye system before and after 120 min of degradation.

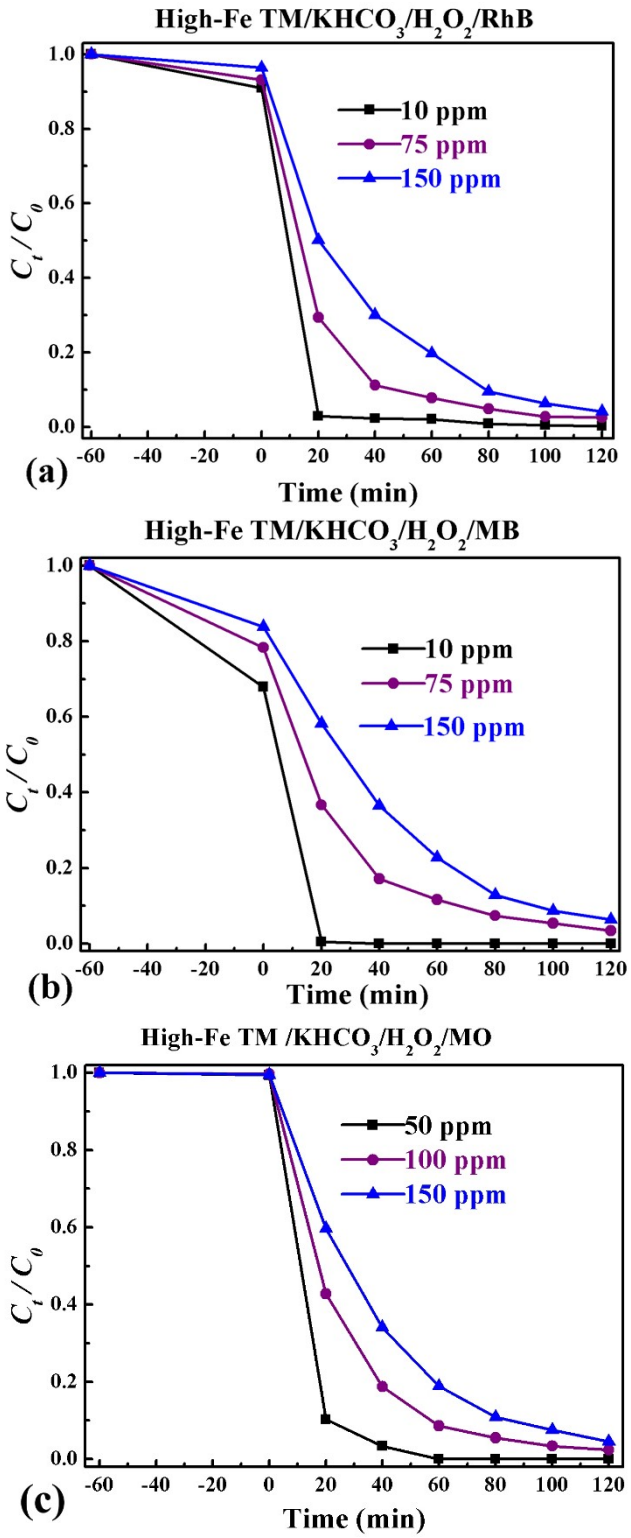

Fig. S4 The degradation rate of dye with different concentrations in High-Fe TM/$KHCO_3$/H_2O_2: (a) RhB, (b) MB and (c) MO.

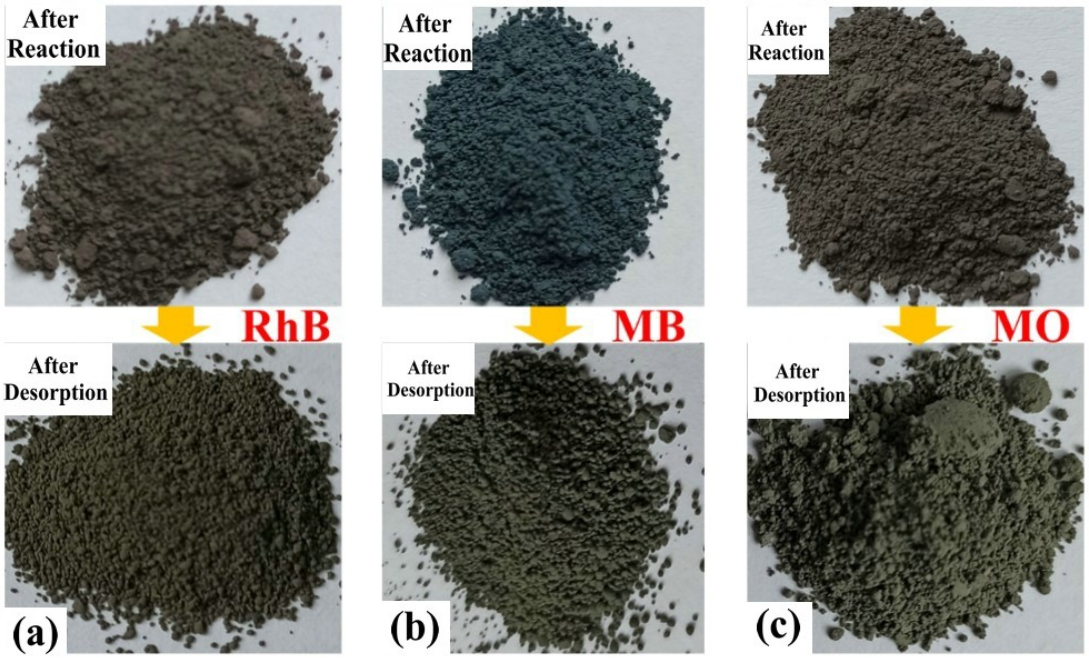

Fig. S5 The photographs of High-Fe TM after the degradation reactions and thermal desorption.