Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Supporting information

Table S1 Feed ratios of the FMHs

	15wt% PVA solution(g)	Silica aerogel(g)	Fe_3O_4 (g)	Graphite nano-sheet (g)
FMH-**1**	18.000	0.400	0	0
FMH-**2**	18.000	0.400	0.450	0.100
FMH-**3**	18.000	0.400	0.450	0.250
FMH-**4**	18.000	0.400	0.450	0.500
FMH-**5**	18.000	0.400	0.450	1.500

Fig. S1 Graphite nanosheets dispersed in water

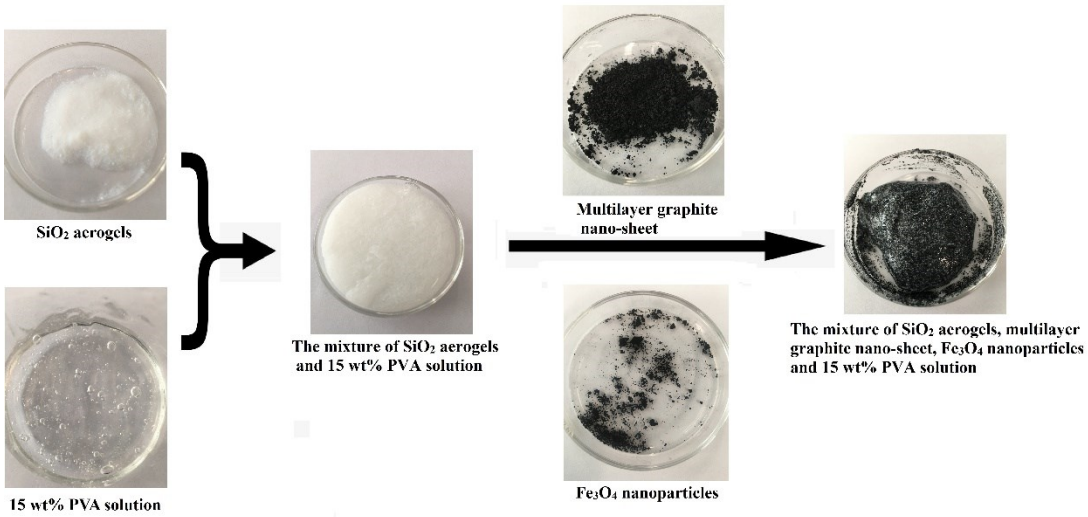

Fig. S2 The preparation process of floating magnetic hydrogels

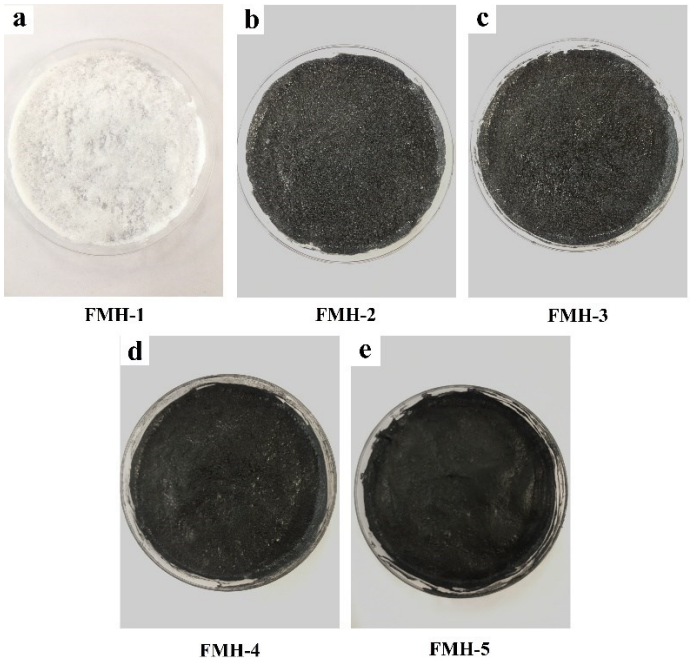

Fig. S3 The photos of (a) FMH-1, (b) FMH-2, (c)FMH-3, (d) FMH-4, and (d) FMH-5

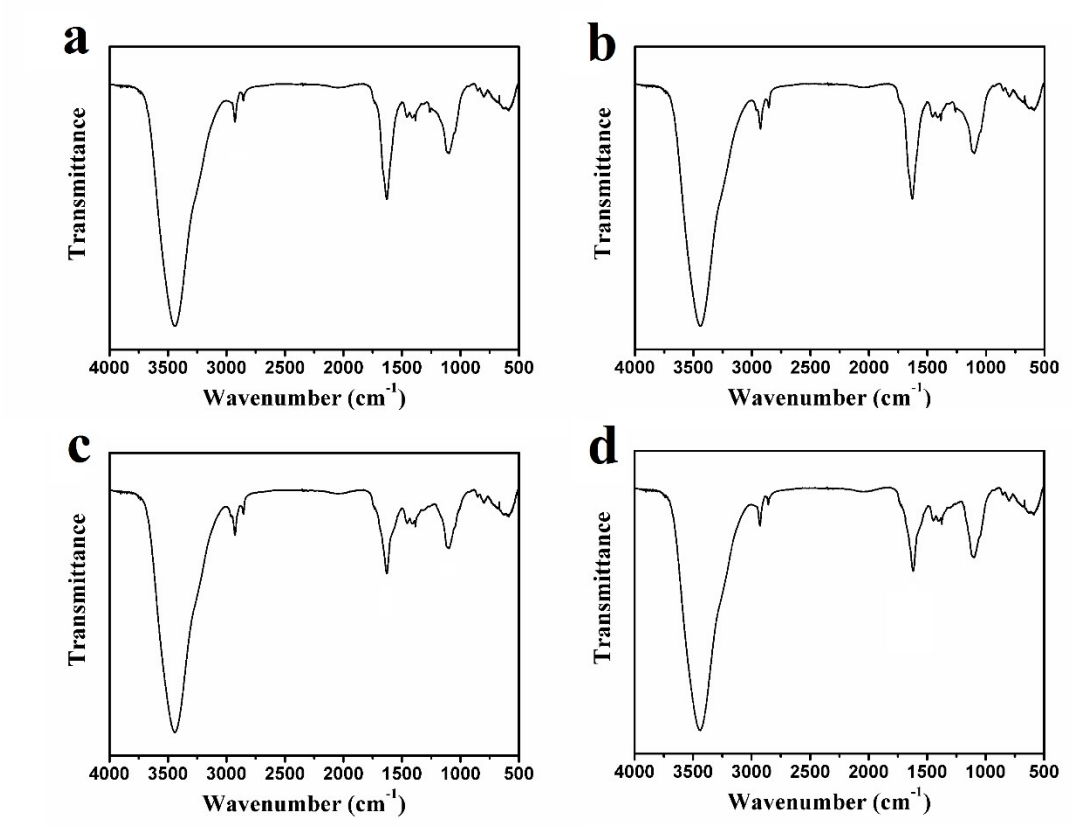

Fig. S4 FT-IR spectra of FMH-1, FMH-3, FMH-4, and FMH-5

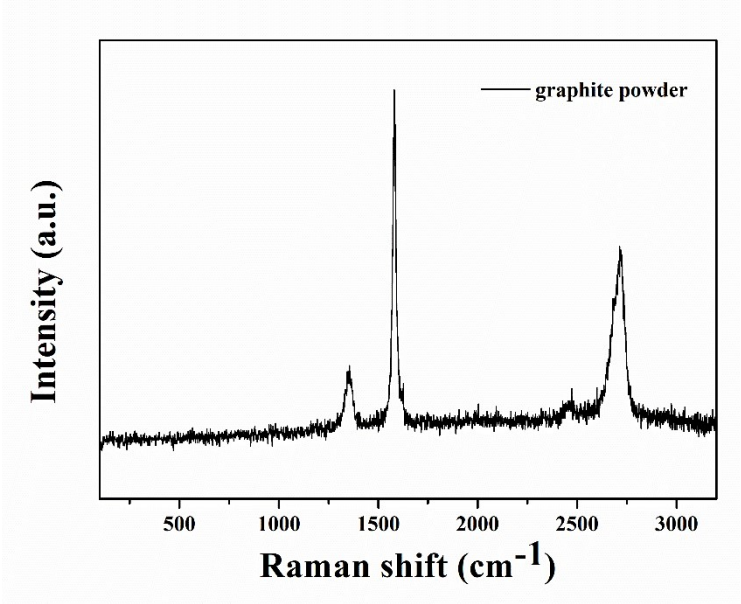

Fig. S5 The Raman spectrum of graphite nano-sheets

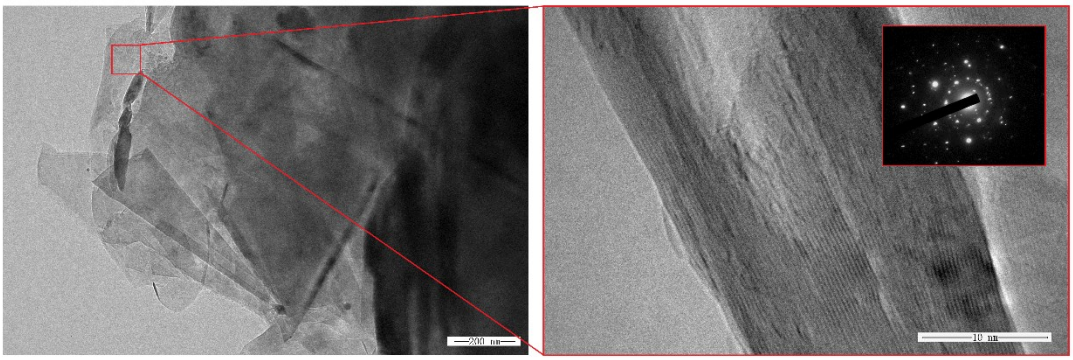

Fig. S6 The TEM images of multilayer graphite nano-sheets

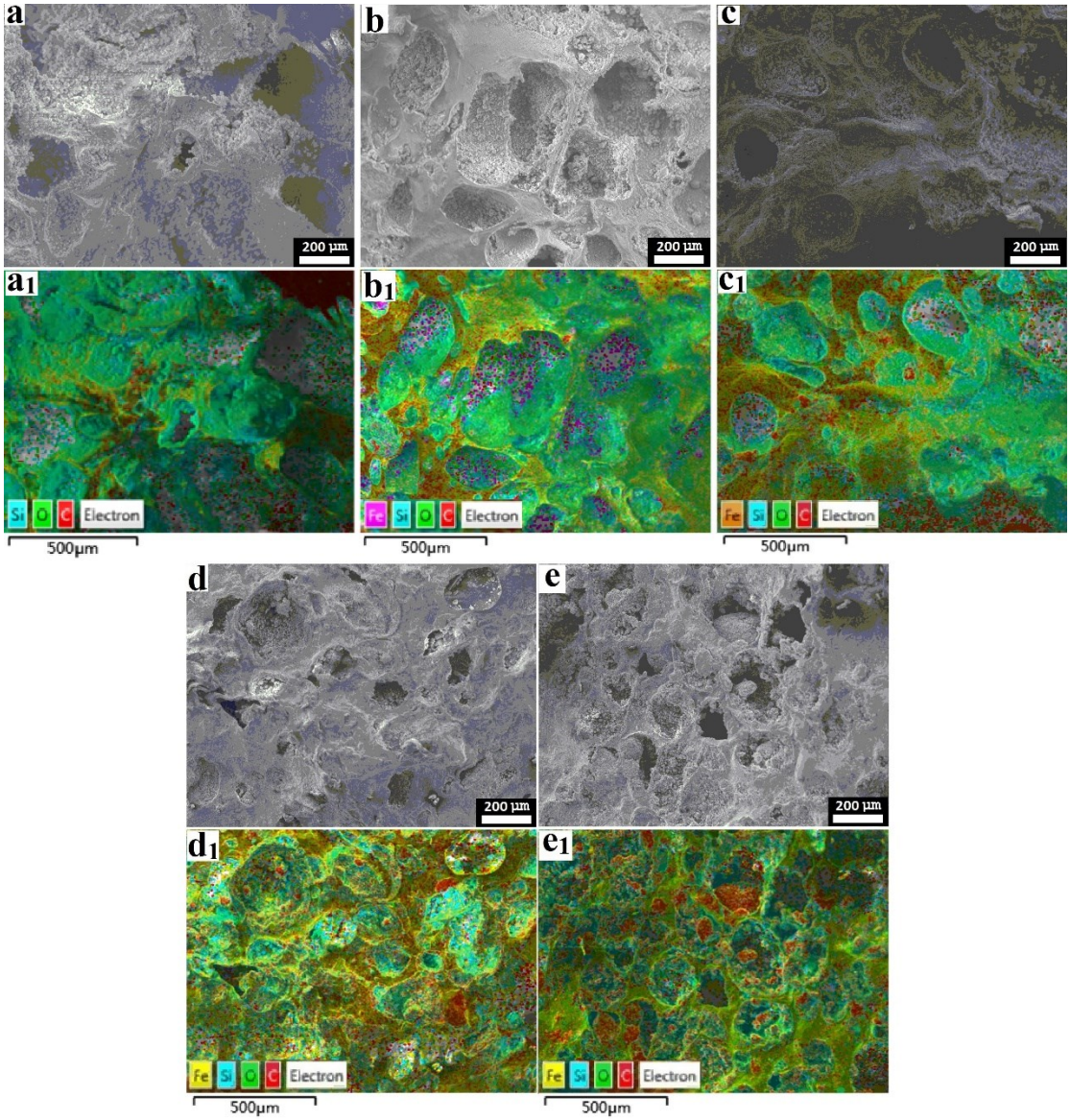

Fig. S7 SEM photos of (a) FMH-1, (b) FMH-2, (c) FMH-3, (d) FMH-4, and (e) FMH-5; EDS elemental mapping of (a_1) FMH-1, (b_1) FMH-2, (c_1) FMH-3, (d_1) FMH-4, and (e_1) FMH-5

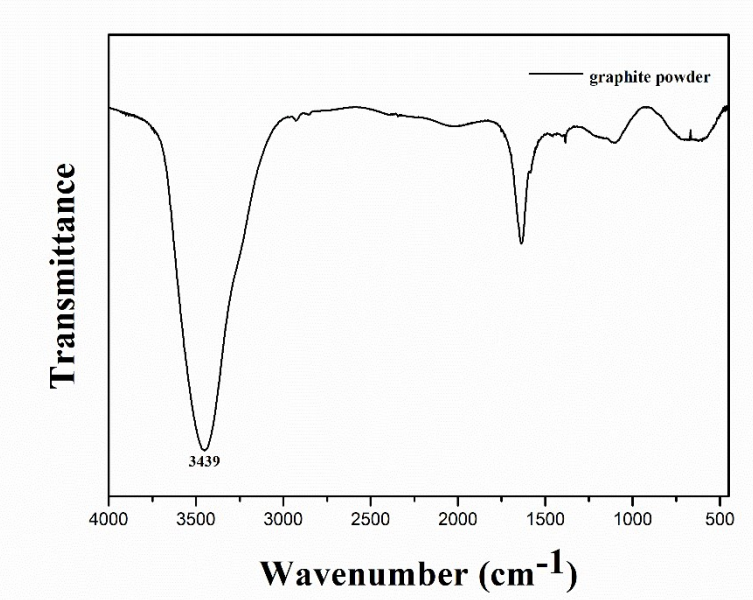

Fig. S8 The IR spectrum of graphite nano-sheets

In order to analyze the s water absorption of FMH-3 and FMH-3 after recycling for five times, the dried samples were evaluated in seawater at 25 °C. The expanded hydrogel samples were blotted with filter paper to remove surface water and weighed immediately. The swelling ratios (G) were defined as:

$$Q = \frac{M_1 - M_0}{M_0} \times 100\%$$

where M_0 is the weight of the dried hydrogel samples and M_1 is the weight of the hydrogels after absorbing water. The hydrogel was immersed in deionized water and was weighed every half an hour, recording its mass until the hydrogel stops increasing. All the experiments were repeated three times.

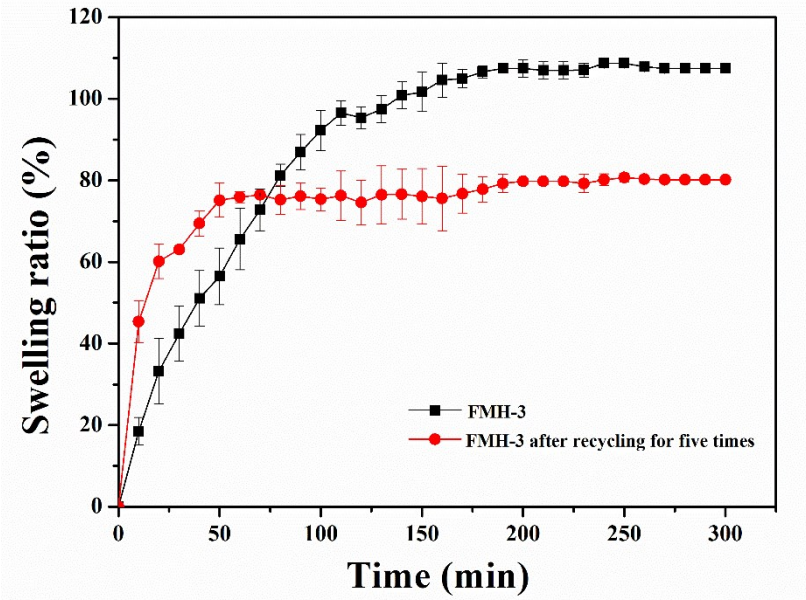

Fig. S9 Swelling ratio of the FMH-3 and FMH-3 after recycling for five times