

## Supplementary Material

### Clay-magnetite co-aggregates for efficient magnetic removal of organic and inorganic pollutants

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**Tables S1-S6.** Detail of Mt-Fe<sub>3</sub>O<sub>4</sub> mixtures preparation for adsorption studies using Mt stock suspension (12.8g/L), Fe<sub>3</sub>O<sub>4</sub> stock suspension (7.5 g/L), MB<sup>+</sup> stock solution (0.001M) and As(V) stock solution (0.001M)

**Table S1.** Mt-Fe<sub>3</sub>O<sub>4</sub> (0.20) for As(V) adsorption isotherm

Tube	Fe <sub>3</sub> O <sub>4</sub> (mL)	Mt (mL)	Mt-Fe <sub>3</sub> O <sub>4</sub> (0.20) (g)	As (V) (mL)	KCl (1M) (mL)	H <sub>2</sub> O (mL)	V <sub>total</sub> (mL)
1	1	2.5	0.0375	0.2	0.1	6.2	10
2	1	2.5	0.0375	0.4	0.1	6	10
3	1	2.5	0.0375	0.6	0.1	5.8	10
4	1	2.5	0.0375	0.8	0.1	5.6	10
5	1	2.5	0.0375	1	0.1	5.4	10
6	1	2.5	0.0375	1.2	0.1	5.2	10
7	1	2.5	0.0375	1.4	0.1	5	10
8	1	2.5	0.0375	1.6	0.1	4.8	10
9	1	2.5	0.0375	1.8	0.1	4.6	10
10	1	2.5	0.0375	2	0.1	4.4	10
11	1	2.5	0.0375	2.2	0.1	4.2	10
12	1	2.5	0.0375	2.4	0.1	4	10
13	1	2.5	0.0375	2.6	0.1	3.8	10
14	1	2.5	0.0375	2.8	0.1	3.6	10

**Table S2.** Mt-Fe<sub>3</sub>O<sub>4</sub> (0.60) for As(V) adsorption isotherm

Tube	Fe <sub>3</sub> O <sub>4</sub> (mL)	Mt (mL)	Mt-Fe <sub>3</sub> O <sub>4</sub> (0.60) (g)	As(V) (mL)	KCl (1M) (mL)	H <sub>2</sub> O (mL)	V <sub>total</sub> (mL)
1	1	0.4	0.0123	0.2	0.1	8.3	10
2	1	0.4	0.0123	0.4	0.1	8.1	10
3	1	0.4	0.0123	0.6	0.1	7.9	10
4	1	0.4	0.0123	0.8	0.1	7.7	10
5	1	0.4	0.0123	1	0.1	7.5	10
6	1	0.4	0.0123	1.2	0.1	7.3	10
7	1	0.4	0.0123	1.4	0.1	7.1	10
8	1	0.4	0.0123	1.6	0.1	6.9	10
9	1	0.4	0.0123	1.8	0.1	6.7	10

10	1	0.4	0.0123	2	0.1	6.5	10
11	1	0.4	0.0123	2.2	0.1	6.3	10
12	1	0.4	0.0123	2.4	0.1	6.1	10
13	1	0.4	0.0123	2.6	0.1	5.9	10
14	1	0.4	0.0123	2.8	0.1	5.7	10

**Table S3.** Mt-Fe<sub>3</sub>O<sub>4</sub>(0.85) for As(V) adsorption isotherm

Tube	Fe <sub>3</sub> O <sub>4</sub> (mL)	Mt (mL)	Mt-Fe <sub>3</sub> O <sub>4</sub> (0.85) (g)	As(V) (mL)	KCl (1M) (mL)	H <sub>2</sub> O (mL)	V <sub>total</sub> (mL)
1	1	0.1	0.0087	0.2	0.1	8.6	10
2	1	0.1	0.0087	0.4	0.1	8.4	10
3	1	0.1	0.0087	0.6	0.1	8.2	10
4	1	0.1	0.0087	0.8	0.1	8	10
5	1	0.1	0.0087	1	0.1	7.8	10
6	1	0.1	0.0087	12	0.1	7.6	10
7	1	0.1	0.0087	1.4	0.1	7.4	10
8	1	0.1	0.0087	1.6	0.1	7.2	10
9	1	0.1	0.0087	1.8	0.1	7	10
10	1	0.1	0.0087	2	0.1	6.8	10
11	1	0.1	0.0087	2.3	0.1	6.5	10
12	1	0.1	0.0087	2.4	0.1	6.4	10
13	1	0.1	0.0087	2.8	0.1	6	10

**Table S4.** Mt-Fe<sub>3</sub>O<sub>4</sub>(0.20) for MB<sup>+</sup> adsorption isotherm

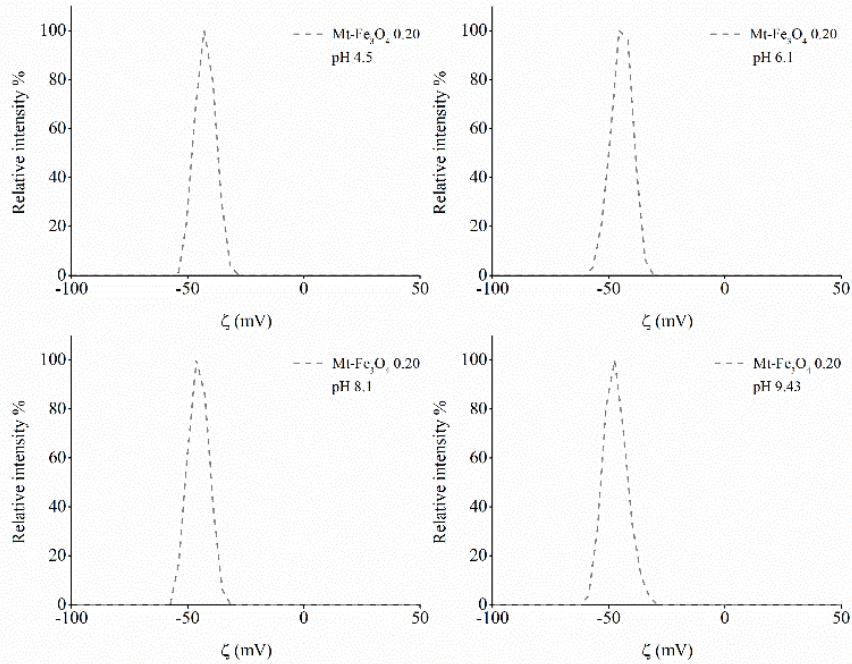
Tube	Mt (mL)	Fe <sub>3</sub> O <sub>4</sub> (mL)	Mt-Fe <sub>3</sub> O <sub>4</sub> (0.20) (g)	MB <sup>+</sup> (mL)	H <sub>2</sub> O (mL)	KCl (1M) (mL)	V <sub>total</sub> (mL)
1	0.1	0.04	0.0015	0.6	9.16	0.1	10
2	0.1	0.04	0.0015	0.8	8.96	0.1	10
3	0.1	0.04	0.0015	1	8.76	0.1	10
4	0.1	0.04	0.0015	1.2	8.56	0.1	10
5	0.1	0.04	0.0015	1.4	8.36	0.1	10
6	0.1	0.04	0.0015	1.6	8.16	0.1	10
7	0.1	0.04	0.0015	1.8	7.96	0.1	10
8	0.1	0.04	0.0015	2	7.76	0.1	10
9	0.1	0.04	0.0015	3	6.76	0.1	10
10	0.1	0.04	0.0015	4	5.76	0.1	10
11	0.1	0.04	0.0015	5	4.76	0.1	10
12	0.1	0.04	0.0015	6	3.76	0.1	10
13	0.1	0.04	0.0015	7	2.76	0.1	10

**Table S5.** Mt-Fe<sub>3</sub>O<sub>4</sub>(0.60) for MB<sup>+</sup> adsorption isotherm

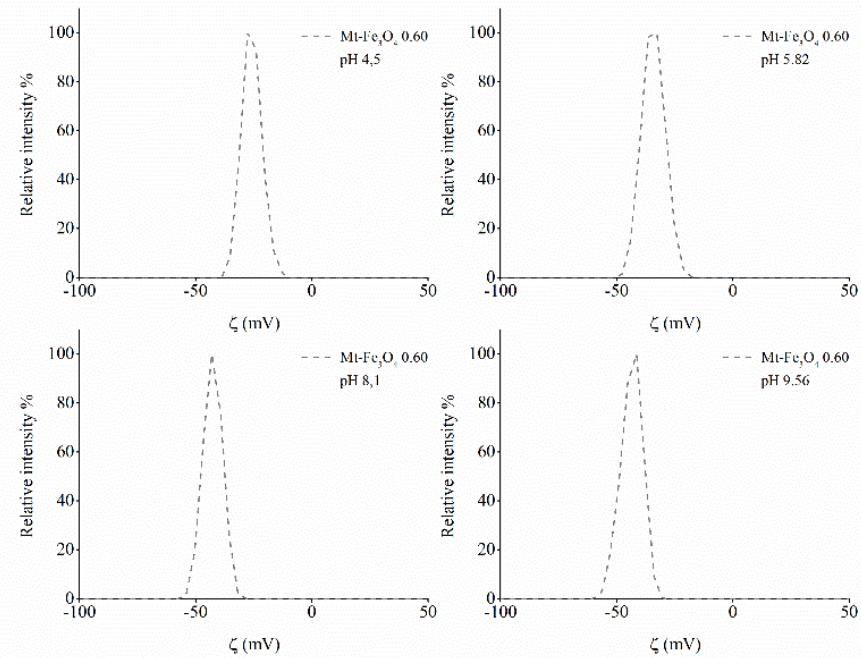
Tube	Mt (mL)	Fe <sub>3</sub> O <sub>4</sub> (mL)	Mt-Fe <sub>3</sub> O <sub>4</sub> (0.60) (g)	MB <sup>+</sup> (mL)	H <sub>2</sub> O (mL)	KCl 1M	V total
1	0.1	0.24	0.003	0.6	8.96	0.1	10
2	0.1	0.24	0.003	0.8	8.76	0.1	10
3	0.1	0.24	0.003	1	8.56	0.1	10
4	0.1	0.24	0.003	1.2	8.36	0.1	10
5	0.1	0.24	0.003	1.6	7.96	0.1	10
6	0.1	0.24	0.003	1.8	7.76	0.1	10
7	0.1	0.24	0.003	2	7.56	0.1	10
8	0.1	0.24	0.003	3	6.56	0.1	10
9	0.1	0.24	0.003	4	5.56	0.1	10
10	0.1	0.24	0.003	5	4.56	0.1	10
11	0.1	0.24	0.003	6	3.56	0.1	10
12	0.1	0.24	0.003	7	2.56	0.1	10

**Table S6.** Mt-Fe<sub>3</sub>O<sub>4</sub>(0.85) for MB<sup>+</sup> adsorption isotherm

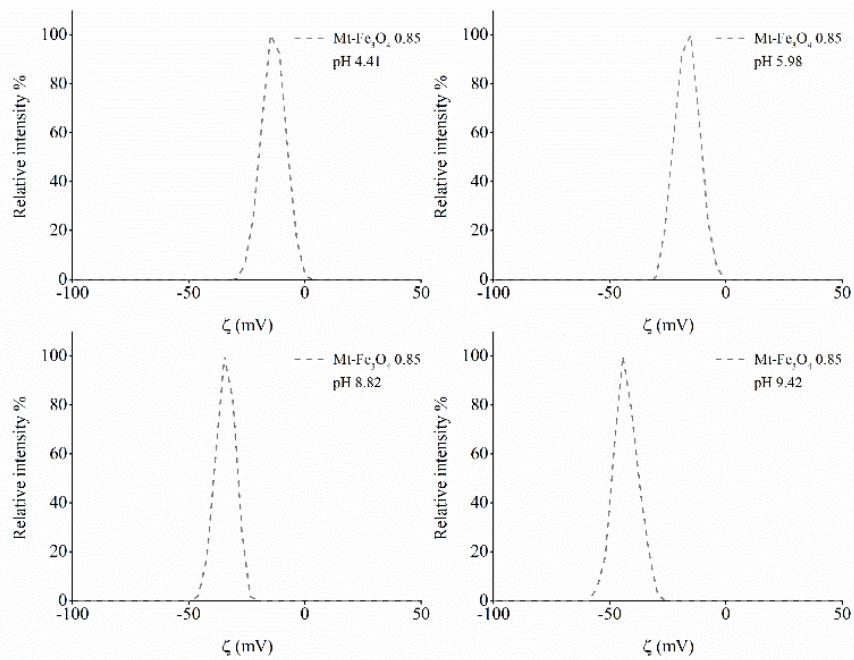
Tube	Mt (mL)	Fe <sub>3</sub> O <sub>4</sub> (mL)	Mt-Fe <sub>3</sub> O <sub>4</sub> (0.85) (g)	MB <sup>+</sup> (mL)	H <sub>2</sub> O (mL)	KCl 1M (mL)	V <sub>total</sub> (mL)
1	0.1	1	0.087	0.6	8.2	0.1	10
2	0.1	1	0.087	0.8	8	0.1	10
3	0.1	1	0.087	1	7.8	0.1	10
4	0.1	1	0.087	1.2	7.6	0.1	10
5	0.1	1	0.087	1.4	7.4	0.1	10
6	0.1	1	0.087	1.6	7.2	0.1	10
7	0.1	1	0.087	1.8	7	0.1	10
8	0.1	1	0.087	2	6.8	0.1	10
9	0.1	1	0.087	2.2	6.6	0.1	10
10	0.1	1	0.087	2.4	6.4	0.1	10
11	0.1	1	0.087	3	5.8	0.1	10
12	0.1	1	0.087	3.4	5.4	0.1	10
13	0.1	1	0.087	4	4.8	0.1	10
14	0.1	1	0.087	5	3.8	0.1	10
15	0.1	1	0.087	6	2.8	0.1	10
16	0.1	1	0.087	7	1.8	0.1	10



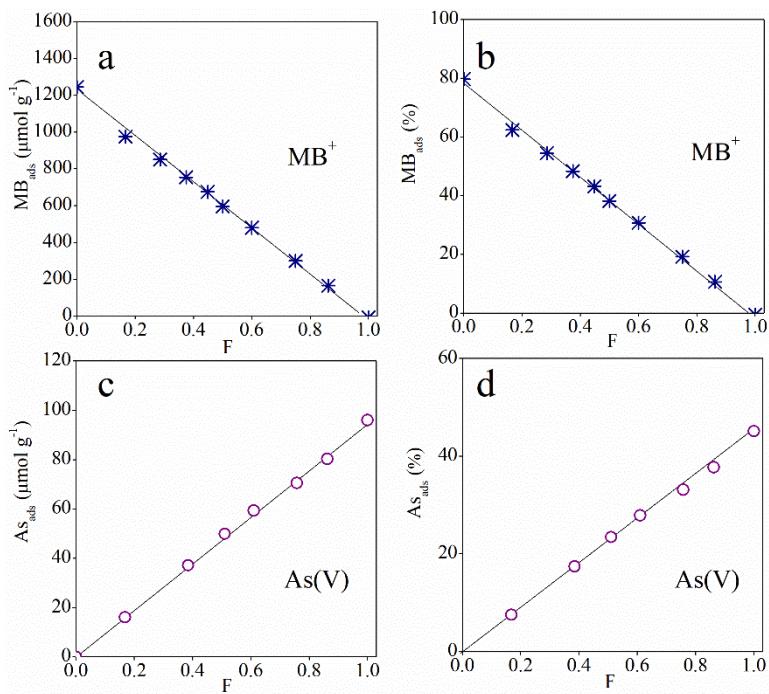
**Figure S1.** Examples of unimodal distributions of zeta potentials at different pH for the Mt-Fe<sub>3</sub>O<sub>4(0.20)</sub> mixture.



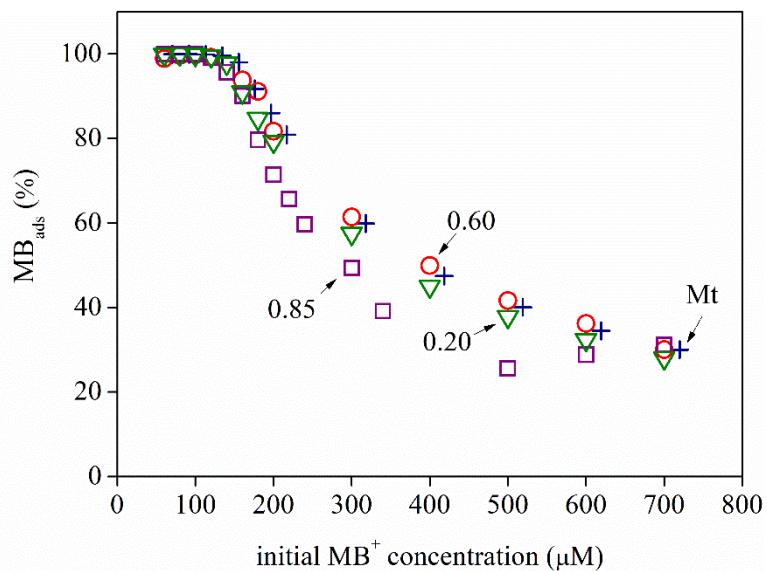
**Figure S2.** Examples of unimodal distributions of zeta potentials at different pH for the Mt-Fe<sub>3</sub>O<sub>4(0.60)</sub> mixture.



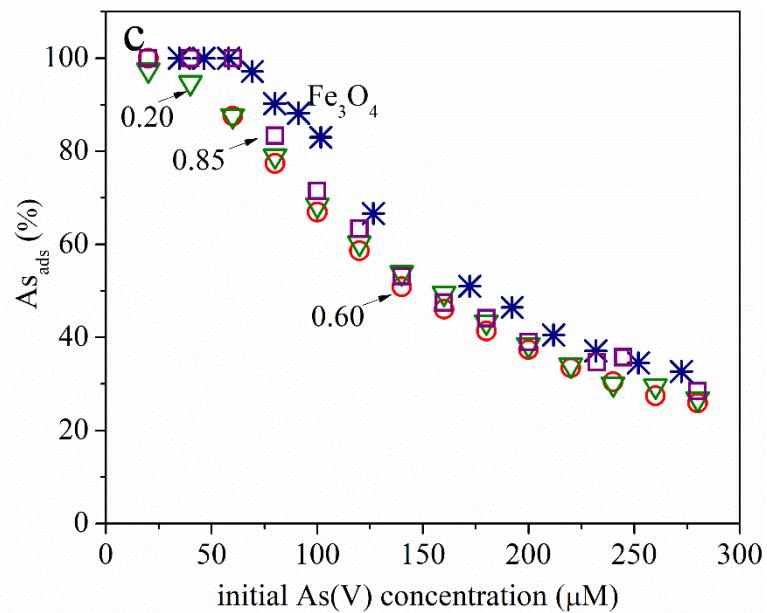
**Figure S3.** Examples of unimodal distributions of zeta potentials at different pH for the Mt- $\text{Fe}_3\text{O}_4(0.85)$  mixture.



**Figure S4.**  $\text{MB}^+$  and  $\text{As(V)}$  adsorption and adsorption percentages on  $\text{Mt-Fe}_3\text{O}_4$  mixtures as a function of composition. Initial concentration of:  $\text{MB}^+$ ,  $2 \times 10^{-4}$  M;  $\text{As(V)}$ ,  $1.6 \times 10^{-4}$  M. Same data as Figure 6 in main text.



**Figure S5.** Adsorption percentages of  $\text{MB}^+$  on  $\text{Mt}-\text{Fe}_3\text{O}_4$  mixtures for the case of adsorption isotherms shown in Figure 7 (main text).



**Figure S6.** Adsorption percentages of  $\text{As}(\text{V})$  on  $\text{Mt}-\text{Fe}_3\text{O}_4$  mixtures for the case of adsorption isotherms shown in Figure 7 (main text). The behavior is typical for adsorption isotherms performed at different initial concentration of the adsorptive and constant solid dosage (“concentration” of solid). The higher the initial concentration, the lower the adsorption percentage, because the surface is becoming progressively saturated.