

# Supplementary Data

## of

# Adsorptive Removal of Arsenic by Mesoporous Iron Oxide in Aquatic System

**Table S1.** Related parameters for the adsorption of As(III) and As(V) on MI.

Arsenic	Freundlich				Langmuir			
	$K_F$	$1/n$	$R^2$	$\chi^2$	$K_L$ (L/mg)	$q_m$ (mg/g)	$R^2$	$\chi^2$
As(III)	35.38	0.6415	0.9787	2.2090	0.36	136.8885	0.9483	7.3913
As(V)	25.69	0.1442	0.8725	0.8990	7.55	31.8196	0.9336	0.5030

Experiment condition: 0.075 g/L of MI into 1–9 mg/L of As(III) and As(V) solution at pH7, 25°C and 200rpm.

**Table S2.** Thermodynamic parameter for adsorption of As(III) and As(V) on MI at different temperatures. (Langmuir and Freundlich isotherm).

Temp (K)		$\ln K$ (Constants)	$\Delta G$ (kJ/mol)	$\Delta S$ (kJ/K · mol)	$\Delta H$ (kJ/mol)
As(III) <sup>a</sup>	278	3.486341	-4.05805	4.9334	1.6959
	298	3.566130	-4.44955		
	318	3.670438	-4.88706		
As(V) <sup>b</sup>	278	1.387394	-1.61491	5.2754	4.3891
	298	2.022157	-2.52310		
	318	1.844241	-2.45554		

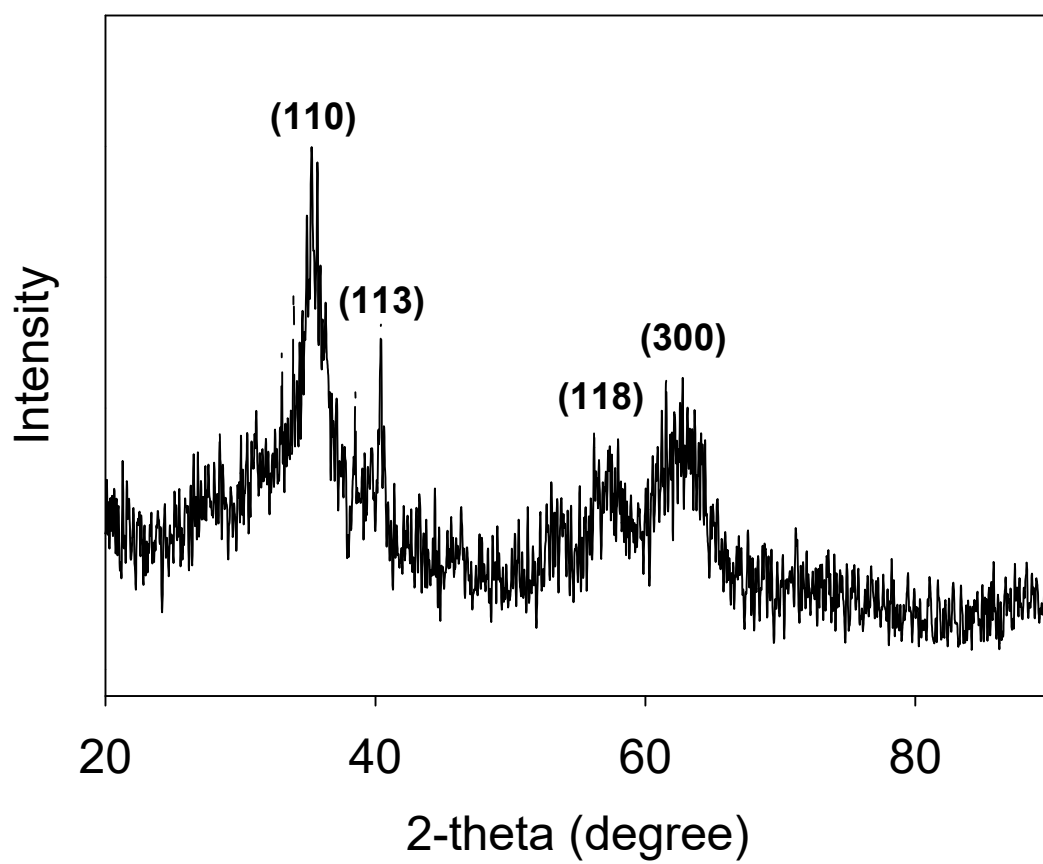
a : Freundlich constants b : Langmuir constants.

Experiment condition: 0.075 g/L of MI into 1–9 mg/L of As(III) and As(V) solution at pH 7, 200rpm.

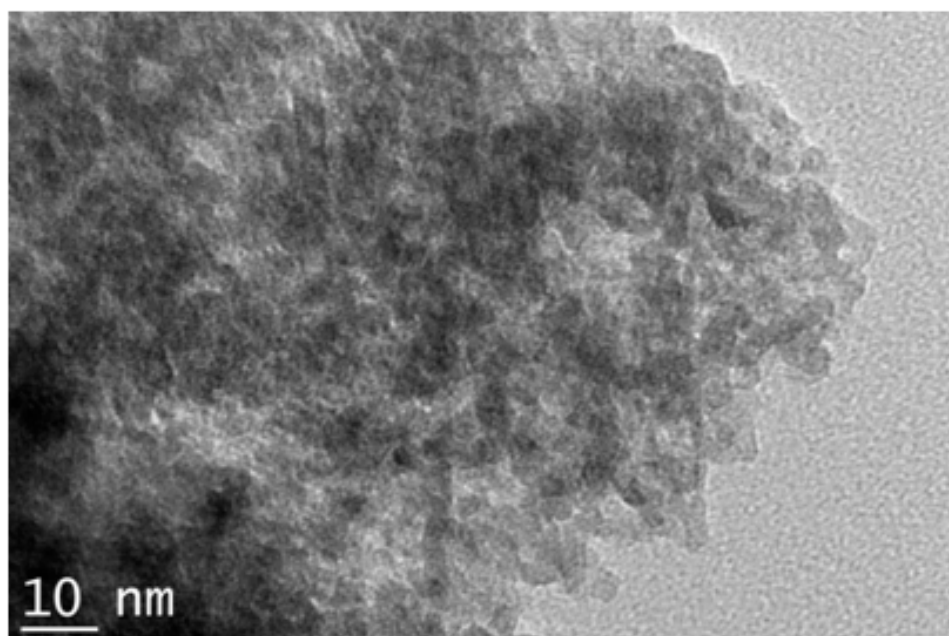
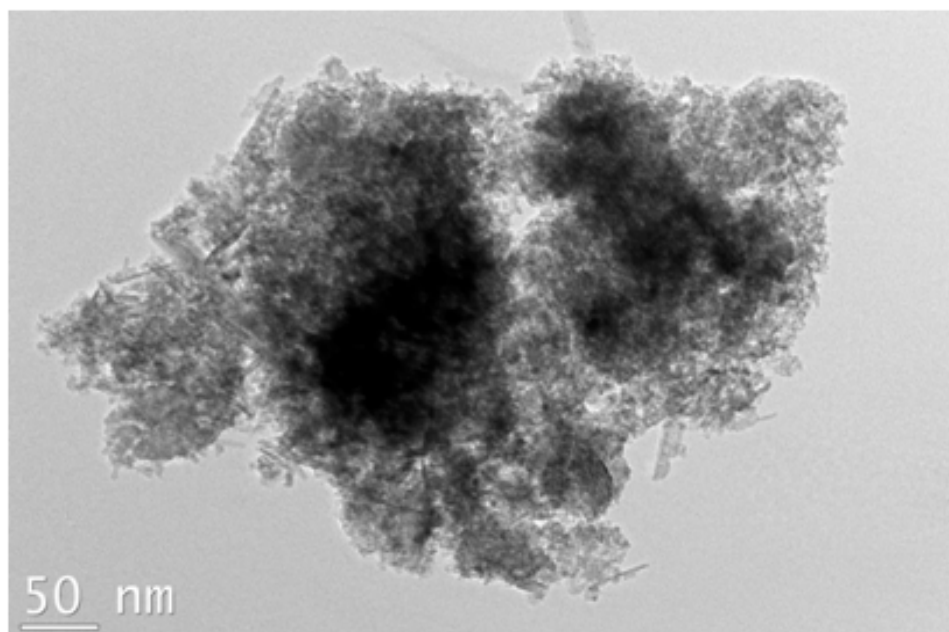
**Table S3.** Intraparticle diffusion rate constants for adsorption of As(III) and As(V) on MI at different MI dosage.

MI (g/L)	As(III)			As(V)		
	0.05	0.075	0.1	0.05	0.075	0.1
$R^2$	0.9616	0.9481	0.9726	0.9412	0.9834	0.9332
$k_d$ (mg/g min <sup>1/2</sup> )	1.2445	1.1671	0.8414	1.8419	1.1939	1.2527

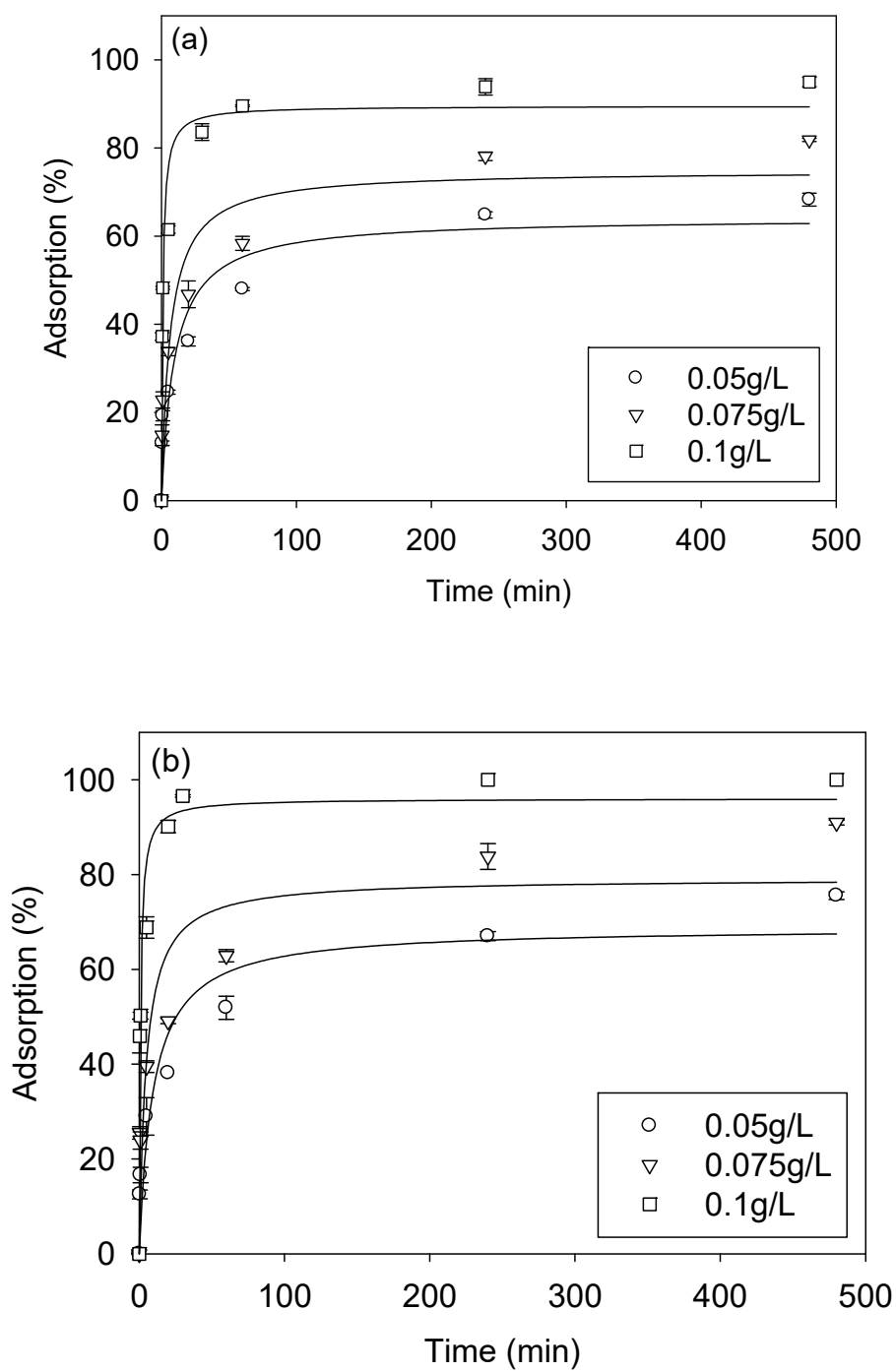
Experiment condition: 1mg/L As(III) and As(V) solutions in 0.01M NaCl, at pH7, 25°C and 200rpm



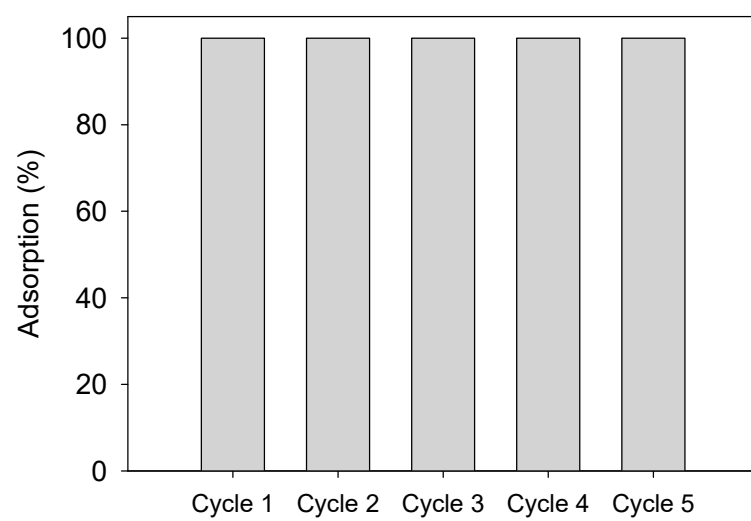
**Figure S1.** Wide-angle X-ray diffraction patterns of MI ( $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>). (Reference: JCPDS file, No. 33-0664).



**Figure S2.** Transmission electron microscope images of MI.



**Figure S3.** Adsorption kinetics of As(III) (a) and As(V) (b) based on pseudo second model with various MI concentrations. The experiments were initiated by adding 0.05, 0.075 and 0.1 g/L of MI into solution containing 1 mg/L of As(III) and As(V) at pH 7.



**Figure S4.** Regeneration cycle of As(V) adsorbed MI. The experiments were initiated by adding 0.2 g/L of MI and 3mg/L As(V) was added at the beginning of each cycle.