Supporting information

Removal of arsenic (III) from water by 2D zeolitic imidazolate framework-67 nanosheets

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1. Equations of adsorption kinetics and isotherms fitting

I. Adsorption kinetics fitting

$$q_t = q_e\left(1 - e^{-k_1 t}\right)$$ Pseudo-first-order nonlinear form (1)

$$q_t = \frac{q_e^2 k_2 t}{1 + q_e k_2 t}$$ Pseudo-second-order nonlinear form (2)

II. Adsorption isotherms fitting

The sorption data were fitted by Langmuir (Eq. (3)) and Freundlich (Eq. (4)) models

$$q_e = \frac{k_L q_0 c}{1 + k_L c} \quad (3)$$

$$q_e = k_F c^{\frac{1}{n}} \quad (4)$$

where c and c_e (mg/L) is the sorption equilibrium concentration of As(III); q_e (mg/g) is the sorption capacity after equilibrium; q_0 (mg/g) is the maximum sorption capacity according to a complete monolayer on the ZIF-67's surface; K_L (L/mg) is the Langmuir constant; K_F ($mg^{1-n} \cdot L^n/g$) is the Freundlich constant.

$Co(mIm)_2(HmIm)_2 + 2H_2O \rightleftarrows Co(mIm)_2(HmIm)_2(OH)_2^{2-} + 2H^+$

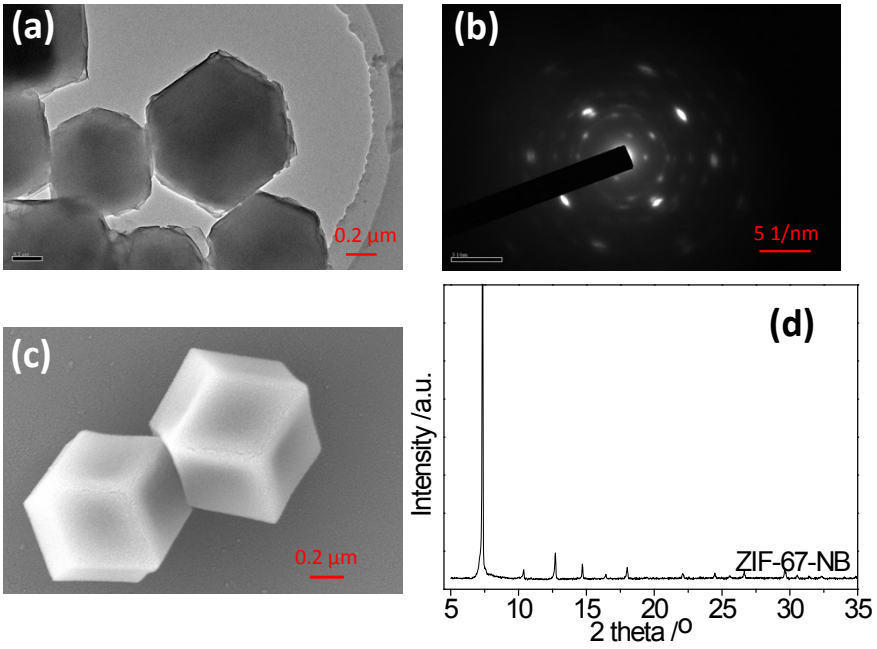

Fig. S1. The prepared ZIF-67-NB at 700 nm (a) High resolution TEM image; (b) SAED pattern of 3D ZIF-67; (c) SEM image; (d) XRD curve.

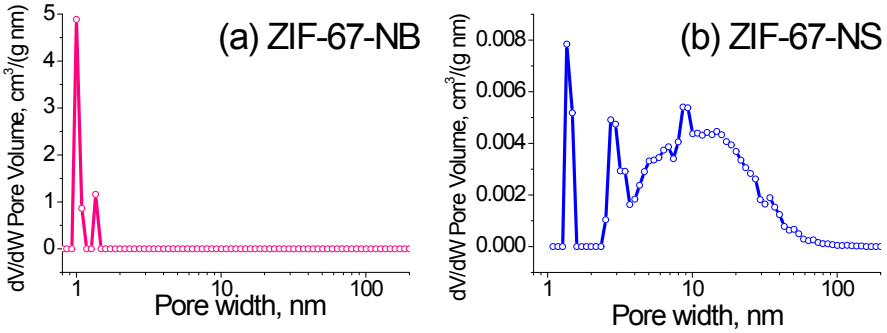

Fig. S2 The pore size distribution of (a) ZIF-67-NB and (b) ZIF-67-NS.

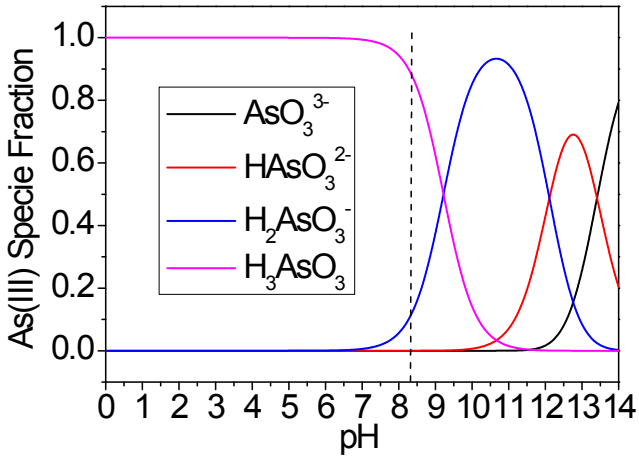

Fig. S3 The theoretical distribution of As(III) protonation species as a function of pH.

Table S1. As(III) specie fraction at pH 8.3.

As(III) Specie Fraction at pH 8.3	AsO_3^{3-}	$HAsO_3^{2-}$	$H_2AsO_3^-$	H_3AsO_3
Proportion	/	/	0.107	0.893

In the case of pH 8.3, the main species of As(III) is H_3AsO_3. Its proportion is 0.893.

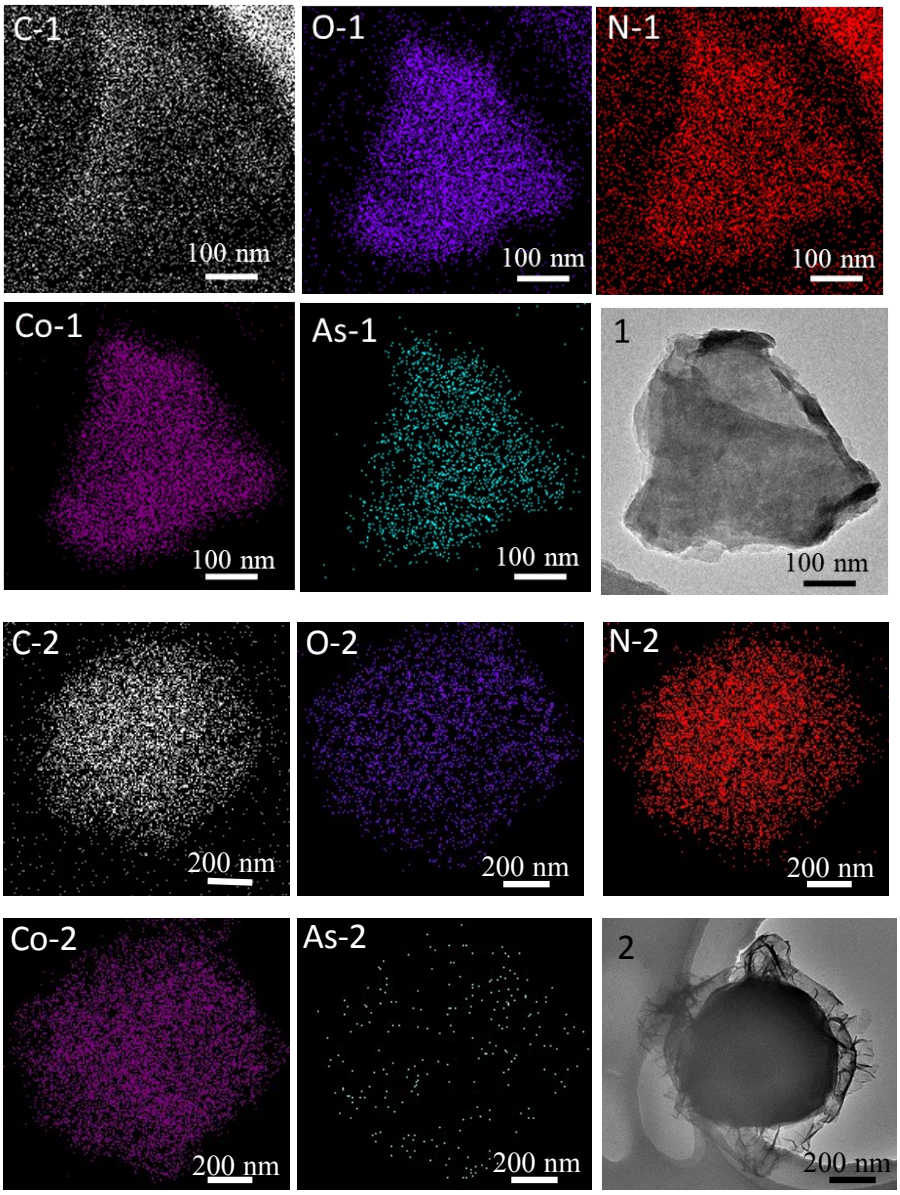

Fig. S4 Energy dispersive X-ray spectroscopy mapping of (1) ZIF-67-NS and (2) ZIF-67-NB after 3 h absorbing.

Table S2. EDX summaries of ZIF-67-NS and ZIF-67-NB after loading As(III).

Atom	ZIF-67-NS		ZIF-67-NB	
	Percent of weight (%)	Atomic percent (%)	Percent of weight (%)	Atomic percent (%)
C	32.96	58.26	31.20	55.59
N	5.29	8.03	12.52	19.13
O	12.42	16.48	5.04	6.75
Co	42.28	15.23	50.32	18.27
As	7.04	2.00	0.92	0.27

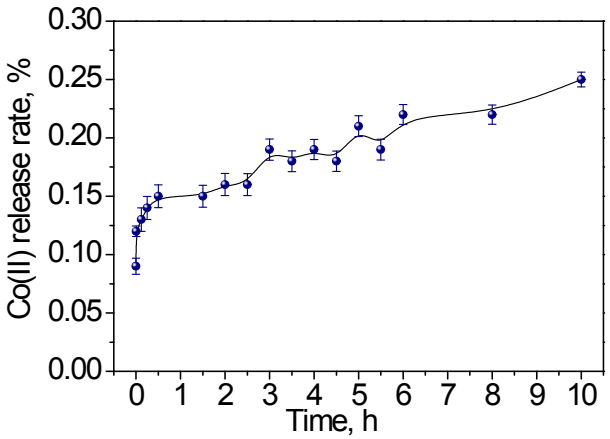

Fig. S5 Leaching rate of Co(II) ions from ZIF-67-NS during adsorption process.

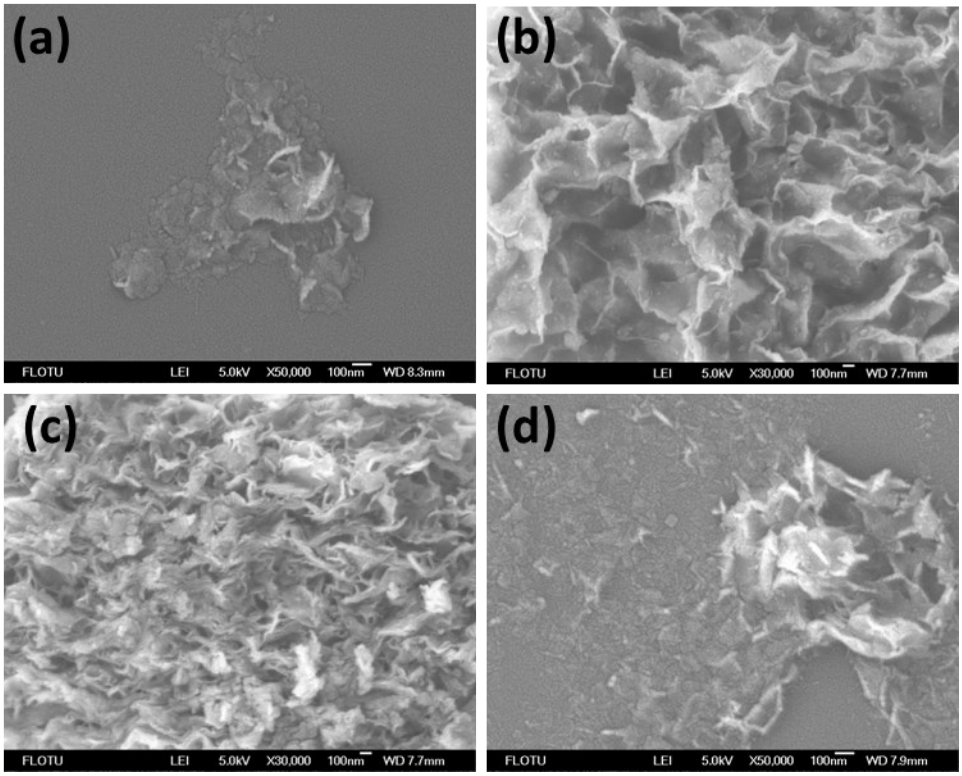

Fig. S6 SEM images of ZIF-67-NS after (a) 10 min of adsorption experiment; (b) 1 h of adsorption experiment; (c) 10 h of adsorption experiment and (d) Regeneration treatment (NaOH washing and ultrasonic processing).