Sustainable Synthesis of Hollow Cu-loaded Poly(*m*-phenylenediamine) particles and Their Application for Arsenic Removal

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Electronic Supplementary Information

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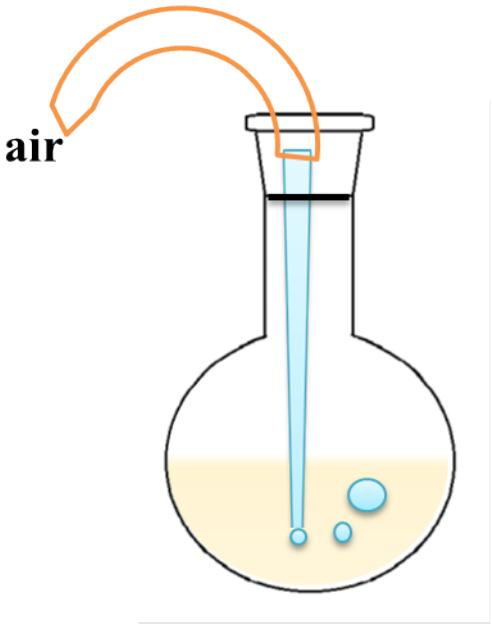
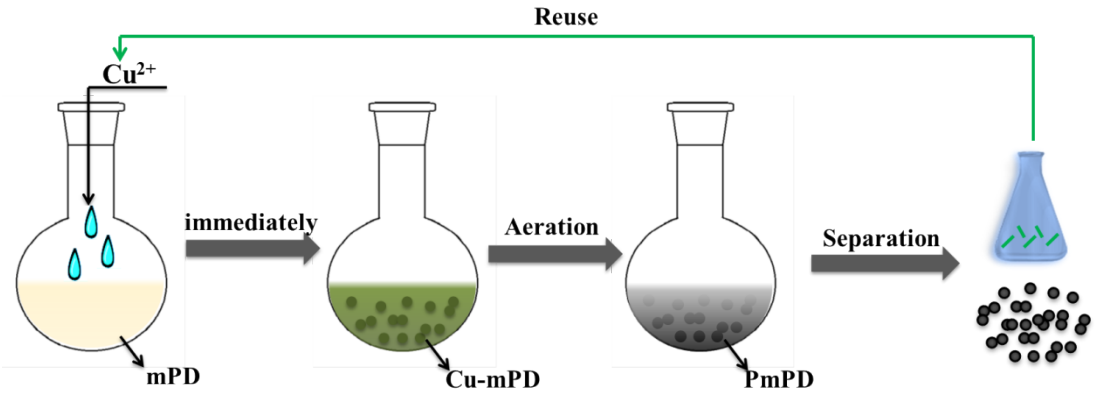
ESI-1 Equipment



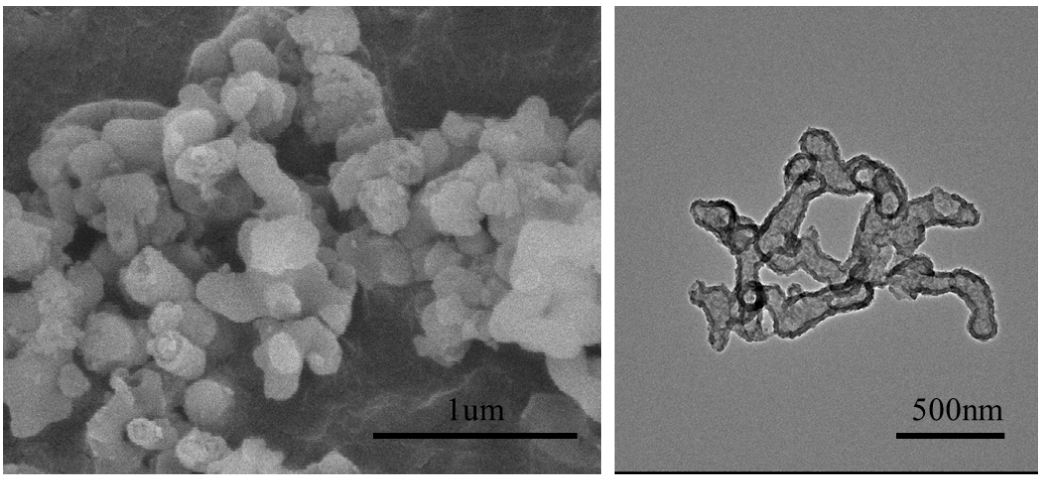
ESI-2 Synthesis sketch map



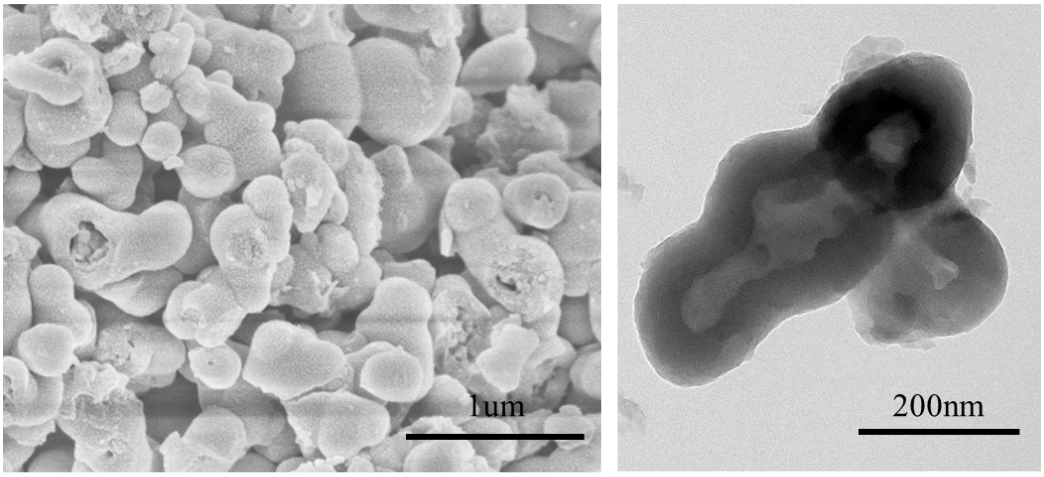
ESI-3 Total TOC and Cu amounts in filtrates after polymerization

PmPD-name	TOC in filtrate (mg L^{-1})	Total Cu in filtrate (mg)
Cu*1:1*	8.7±0.4	864±44
Cu*1:0.5*	9.65±0.6	445±38
Cu*1:0.25*	122.5±4	65±2

ESI-4 SEM and TEM images of PmPD-Cu*1:1* in different time.

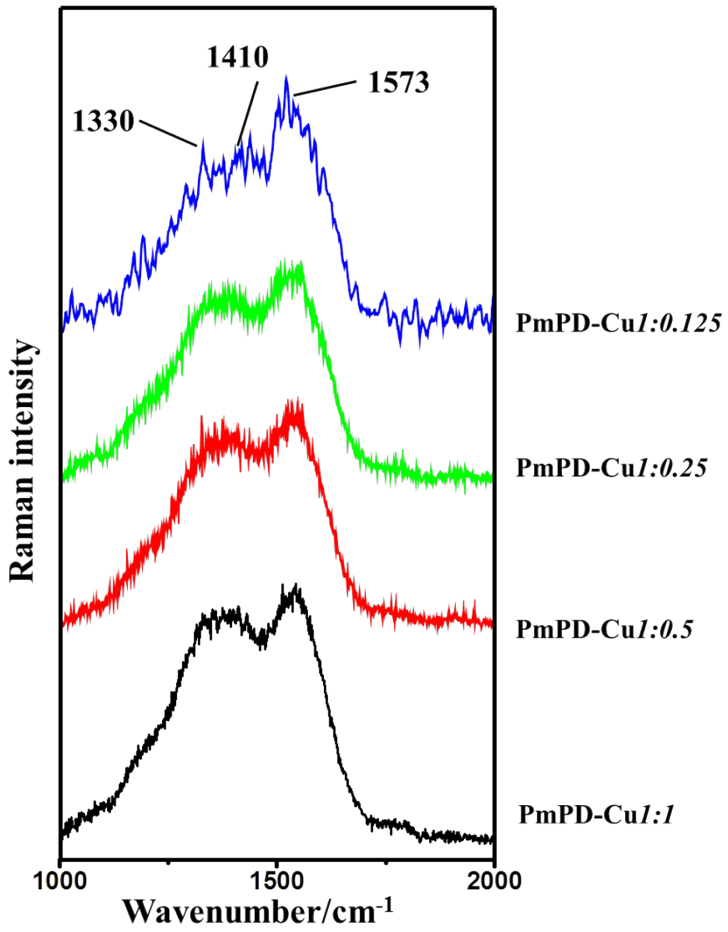


(a) PmPD-Cu*1:1*-before air introduction



(b) PmPD-Cu*1:1* -after reaction for 6h

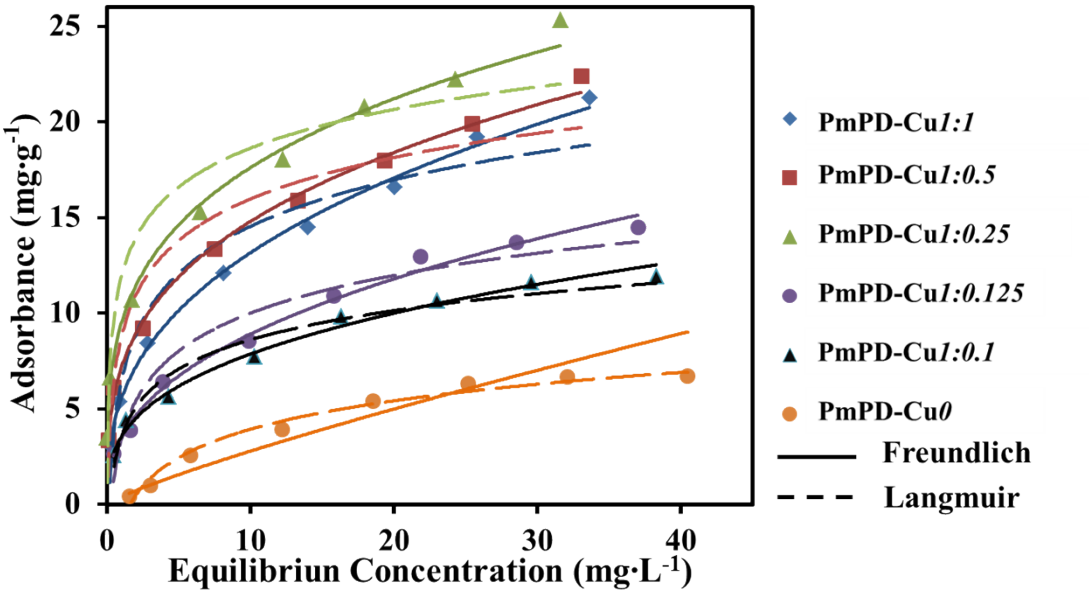
ESI-5 Raman spectra of PmPD particles.



ESI-6 Parameters of Langmuir and Freundlich models simulated by liner fit for the adsorption of arsenic on PmPD particles.

PmPD-name	Langmuir model		
	K_L	Q_m(mg·g^{-1})	R^2
Cu*1:1*	0.0295±0.0004	24.51±0.12	0.9784±0.0032
Cu*1:0.5*	0.0382±0.0013	24.60±0.33	0.9845±0.0004
Cu*1:0.25*	0.0448±0.0039	28.13±0.12	0.9793±0.0051
Cu*1:0.125*	0.0298±0.0005	16.63±0.10	0.9853±0.0071
Cu*1:0.1*	0.0399±0.0021	13.12±0.19	0.9897±0.0045
Cu*0*	0.0089±0.0011	11.24±0.69	0.9913±0.0001

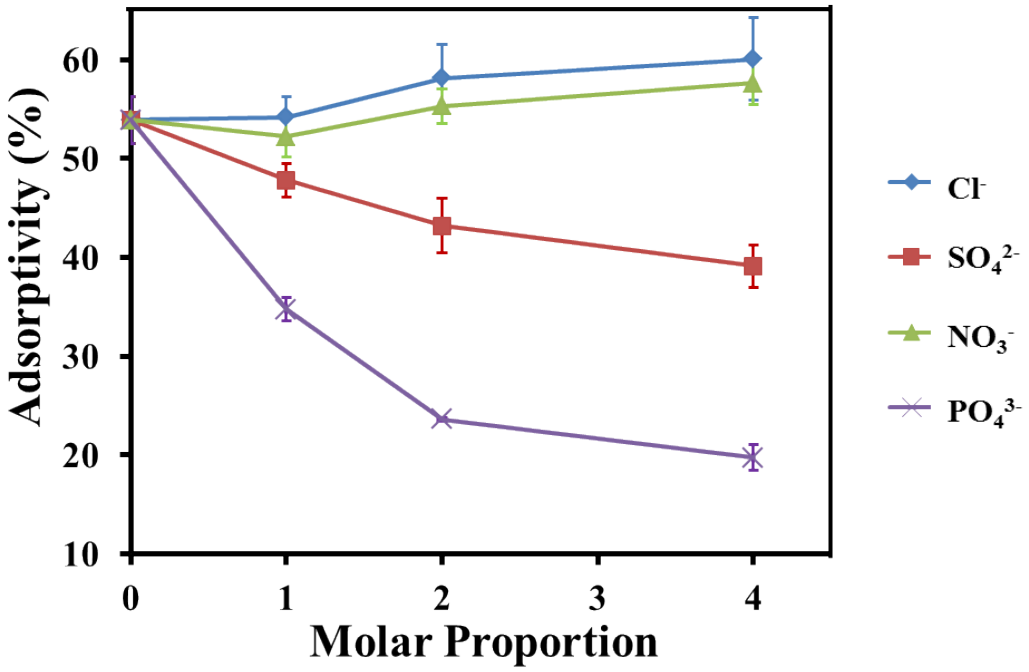
PmPD-name	Freundlich model		
	K_F	1/n	R^2
Cu*1:1*	3.0191±0.0719	0.3613±0.0068	0.9962±0.0008
Cu*1:0.5*	3.8971±0.3005	0.3216±0.0122	0.9956±0.0015
Cu*1:0.25*	5.9635±0.0027	0.2699±0.0002	0.9951±0.0026
Cu*1:0.125*	2.0266±0.0487	0.4009±0.0119	0.9896±0.0051
Cu*1:0.1*	1.7481±0.0569	0.3334±0.0090	0.9888±0.0041
Cu*0*	0.1030±0.0162	0.8142±0.0420	0.9563±0.0048


Adsorbance (mg·g-1)
Equilibriun Concentration (mg·L-1)
0
5
10
15
20
25
0
10
20
30
40
PmPD-Cu1:1
PmPD-Cu1:0.5
PmPD-Cu1:0.25
PmPD-Cu1:0.125
PmPD-Cu1:0.1
PmPD-Cu0
Freundlich
Langmuir

ESI-7 Kinetic parameters of Pseudo-first and -second models for the adsorption of arsenic on PmPD-Cu*1:0.25*.

PmPD-name		Cu*1:0.25*
$Q_{e,exp}$		6.55±0.19
Pseudo-first-order model	k(min^{-1})	0.00058±0. 00012
	$Q_{e,cal}$ (mg·g^{-1})	1.247±0. 029
	R^2	0.8662±0. 1037
Pseudo-second-order model	h(min^{-1})	2.522±0. 538
	$Q_{e,cal}$ (mg·g^{-1})	6.081±0. 0278
	R^2	0.99996±0. 00003

ESI-8 Effect of coexisting ions on AsO_4^{3-} adsorption with PmPD-Cu*1:0.25*.



Molar Proportion is the molar proportion of competing anions to AsO_4^{3-} (from 1:1 to 4:1).