

Polysaccharide-derived hydrogel water filter for the rapid and selective removal of arsenic

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Table S1. List of some chitosan based hydrogel materials for the removal of toxic pollutants.

Hydrogel (Adsorbent)	Adsorbate	Reference
Magnetic chitosan- 2-aminopyridine glyoxal Schiff's base resin (CSAP)	Cu(II), Cd(II) and Ni(II)	1
Gelatin–chitosan (GC) hydrogel	Pb(II), Hg(II), Cd(II) and Cr(III)	2
Graphene oxide–chitosan (GO–CS)	Methylene blue, Eosin Y, Cu(II) and Pb(II)	3
Composite chitosan biosorbent (CCB)	As(III) and As(V)	4
Magnetic cellulose–chitosan	Cu ²⁺ , Fe ²⁺ and Pb ²⁺	5
CM-cellulose/chitosan blend hydrogels	Cu(II), Cd(II) and Zn(II)	6
Chitosan based 3D hydrogel framework (ChF)	¹⁵² Eu and ¹³⁷ Cs	7
Chitosan-based hydrogel, graft-copolymerized with methylenebisacrylamide and poly(acrylic acid) (CS-co-MMB-co-PAA)	Pb(II), Cd(II), and Cu(II)	8
chitosan: red scoria (Ch–Rs) and chitosan: pumice (Ch–Pu)	As(V)	9
EDTA Functionalized Chitosan/Polyacrylamide Double Network Hydrogel	Cd(II), Cu(II) and Pb(II)	10

Table S2. Detailed operating conditions of ICP-OES and analytical characteristics of heavy metals measured by the instrument

Instrumental condition	Element	Wavelength (nm)
RF power: 1350 W Pump rate: 50 rpm	As	197.2
	Cd	226.5
		228.8

1 L/min	Cr	267.7
Nebulizer gas flow: 0.6 L/min		283.5
Coolant gas flow: 12 L/min	Ni	221.6
	Pb	341.4
		216.9

Table S3. Details of groundwater sampling location

Sample name	Sampling location	Coordinates	Depth (ft)
GWS1	Ward no. 10, Ashokenagar Kalyangarh Municipality, North 24 Parganas, West Bengal, India	22°50'51"N 88°37'28"W	40
GWS2	Ward no. 11, Ashokenagar Kalyangarh Municipality, North 24 Parganas, West Bengal, India	22°51'1"N 88°37'28"W	60

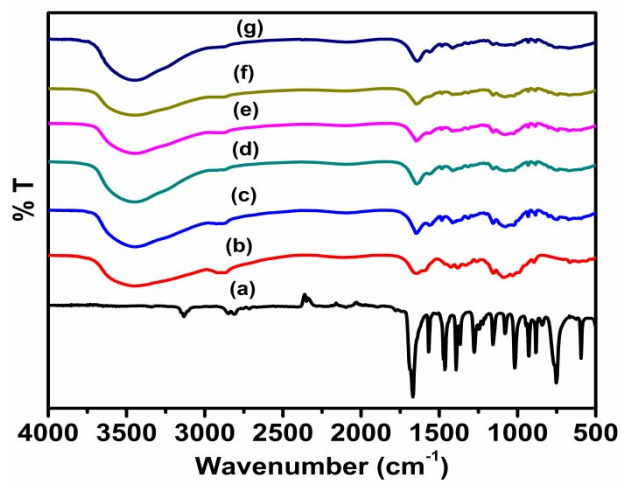


Fig. S1 FT-IR spectra of (a) furfuraldehyde, (b) chitosan, (c) FCH0.9, (d) FCH1.2, (e) FCH1.5, (f) FCH2.0 and (g) FCH2.5.

Table S4. Chemical shifts of FCH by solid state ^{13}C CP-MAS NMR

C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	C ₇	C _{1a}	C _{2a}	C _{3a}	C _{4a}
104.2	75.8	83.8	92.7	60.6	57.2	156.4	147.4	120.7	111.8	143.3

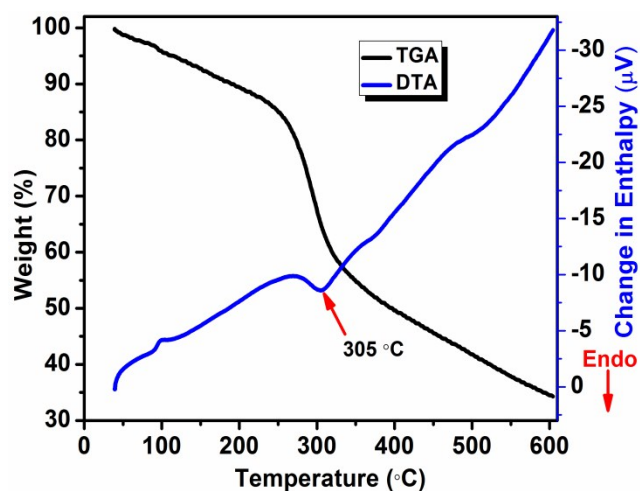


Fig. S2 Thermogravimetric analysis of FCH.

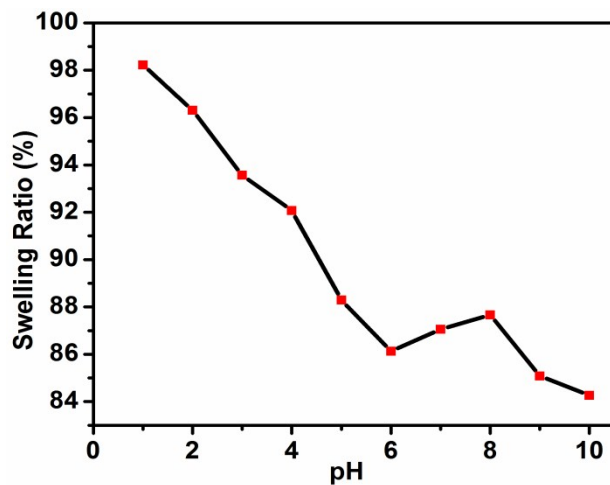


Fig. S3 pH dependent swelling study of FCH.

Table S5: The detail analysis of groundwater sample

Sample name	Name of metal ions	Conc. of metals before adsorption (ppb)	Conc. of metals after adsorption (ppb)	Removal efficiency (%)
GWS1	As(V)	15	0 (pH=3)	100
			0 (Groundwater pH)	100
	Cd(II)	0	0	0
	Cr(III)	9	8 (pH=3)	11
			6 (Groundwater pH)	22
	Ni(II)	0	0	0
	Pb(II)	25	20 (pH=3)	20
			20 (Groundwater pH)	20
As(V)	21	0 (pH=3)	100	
		0	100	

GWS2			(Groundwater pH)	
	Cd(II)	3	2 (pH=3)	33
			3	0
	Cr(III)	6	5 (pH=3)	17
			5 (Groundwater pH)	17
	Ni(II)	12	11 (pH=3)	8
			11 (Groundwater pH)	8
	Pb(II)	22	19 (pH=3)	14
			18 (Groundwater pH)	18

Reference

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