Supplementary Materials

Cellulose-Based Hydrogels for Wastewater Treatment: A Concise Review

Table S1. Recent works on removal of heavy metals using CBHs.

Cellulose-Based Hydrogel	Hydrogel Preparation Mechanism	Metal	Adsorption Capacity, mg/g	Ref.
Cellulose beads from bleached almond shell	Dissolution- coagulation- freeze-drying method	Cu(II)	128.24	[1]
Microcrystalline Cellulose hydrogels	Self-assembly	Heavy metal	-	[2]
Microcrystalline Cellulose hydrogels	Cross-linked via freeze-drying/ physical cross-linking and hydrogen bond	Ag(I)	234.32	[3]
Microcrystalline Cellulose composite hydrogels	Chemical crosslinking	Cu(II) Pb(II)	For GTD-1* Cu(II)-65.1 Pb(II)-80.9 For GTD-2** Cu(II)-74.2 Pb(II)-91.7	[4]
Cellulose filament fibers-based hydrogel	Chemical crosslinking	Cu(II)	51.3	[5]
Microcrystalline Cellulose hydrogels	Chemical crosslinking	Cr(VI) Cd(II) Cu(II) Zn(II) Pb(II)	0.0019 0.001995 0.001 0.003 0.001985	[6]
3D MnO_2 modified biochar-based porous hydrogels	Free-radical polymerization	Cd(II) Pb(II)	84.76 70.90	[7]
Cellulosic black cumin seed powder based	Co-precipitation Graft copolymerization method	As(III)	1.0	[8]
Hydroxypropyl Cellulose Beads	Ionotropic gelation	Pb(II)	47.72	[9]
Sawdust based adsorbents	liquid phase reduction method	As(III/V) Cr(III)	111.37 268.7	[10]
Carboxymethyl cellulose hydrogel	Free radical polymerization	Ce(III) Gd(III)	205.48 216.73	[11]
Carboxyl methylcellulose and chitosan-derived nanostructured sorbents	Chemical cross-linking	Cd(II) Cr(VI)	470.0 347.0	[12]
Cellulose nanocrystal composite hydrogel	Hydrothermal method	As(III)	13.866	[13]

		As(V)	15.712	
Cellulose (cotton) based adsorbent	Graft copolymerization method	Cr(VI)	490.3	[14]
Cellulose nanofibers based fluorescent hydrogel	Free-radical polymerization	Cr(VI) Ba(II) Pb(II) Cu(II)	534.4 271.9 789.6 98.2	[15]
Gum Tragacanth based nanocomposite hydrogel	Microwave assisted polymerization	Hg(II) Cr(VI)	666.6 473.9	[16]
Soybean residue-poly(acrylic acid) (SR–PAA) based hydrogel	UV radiation assisted polymerization	Cd(II) Pb(II)	160.75 422.28	[17]
Carboxymethyl Cellulose/Poly(N-isopropylacrylamide-co-acrylic acid) hydrogel	Free radical polymerization	U(VI)	14.69	[18]
Microcrystalline cellulose hydrogel coating nanoscale Fe^0 (CH@nFe^0)	Graft copolymerization	Cr(VI)	-	[19]
Carboxymethyl cellulose based hydrogel-Poly(CMC/Methacrylic acid)	Direct radiation grafting technique	Cu(II) Co(II)	21000 34000	[20]
Carboxymethyl cellulose based hydrogel-Poly(CMC/Acrylamide)	Direct radiation grafting technique	Cu(II) Co(II)	19000 24000	[20]
Wheat straw cellulose-based polymeric composites	Graft copolymerization	Cu(II)	130	[21]

*Graphene oxide-triethylenetetramine-dialdehyde cellulose hydrogel in heterogeneous system.
**Graphene oxide-triethylenetetramine-dialdehyde cellulose hydrogel in homogeneous system

Table S2. Recent works on removal of dyes using CBHs.

Cellulose-Based Hydrogels	Hydrogel Preparation Mechanism	Dye	Adsorption Capacity, mg/g	Ref.
Dialdehyde carboxymethyl cellulose–gelatin based	Crosslinked via covalent bond leading Schiff base reaction	Rhodamine B Methyl Violet	763.4 584.7	[22]
Cellulose hydrogels physically crosslinked by glycine	Self-assembly	Dye adsorption	-	
Microcrystalline cellulose-based hydrogel	Crosslinked via hydrogen bond, physical crosslinking	Methylene Blue	13381.62	[3]
Sugar-beet pulp-based hydrogel	Instantaneous gelation	Methylene Blue	1428.6	[23]
Trimethyl ammonium grafted cellulose foams; cationic cellulose foam	Grafting and chemical crosslinking	Anionic Dye Eosin Y	364.22	[24]
Tunicate cellulose hydrogels	Dissolution-regeneration process	Methylene Blue	-	[25]
Amide-functionalized cellulose-based	Chemical crosslinking	Acid Black 1 Acid Red 18	751.8 417.9	[5]
Cellulose/biopolymer/Fe_3O_4 hydrogel microbeads	Sol–gel transition	Crystal violet Methyl Orange	62 14	[26]
Carboxylated cellulose nanocrystal– MnO_2 beads	Physical crosslinking	Methylene Blue	136.7	[27]
Cellulosic black cumin seed powder based	Graft copolymerization method	Methylene Blue	10.0	[8]
Cellulose (cotton linters, DP 500) based hydrogels	Coagulation and regeneration	Methylene Blue	-	[28]
Nanocrystalline cellulose hydrogels	Chemical crosslinking	Methyl Orange	193	[29]
Thiol-modified Carboxymethyl cellulose nanocrystal hydrogel	Chemical crosslinking	Methylene Blue	756	[30]
Lemongrass leaf based novel cellulose biosorbent	-	Crystal Violet	36.10	[31]
Bagasse based nanocomposite hydrogel	-	Drimarine Yellow HF	-	[32]
Carboxymethyl cellulose-based hydrogel	Graft copolymerization method	Acid Red 73	-	[33]
Carboxymethyl cellulose-g-polyacrylamide/montmorillonite nanocomposite hydrogel	Free radical polymerization	Malachite green	172.4	[34]
Carboxymethyl cellulose -polyaniline hydrogel	Free radical polymerization	Methylene Blue Rohdamin B Methyl Orange	12.2 8.79 6.11	[35]
Cellulose nanowhiskers (cotton powder) based hybrid hydrogel	Sol–gel transition	Methylene Blue	-	[36]
Carboxymethyl cellulose based hydrogel-Poly(CMC/Methacrylic acid)	Direct radiation grafting technique	Acid blue Methyl green	1800 2400	[20]
Carboxymethyl cellulose based hydrogel-Poly(CMC/Acrylamide)	Direct radiation grafting technique	Acid blue Methyl green	1600 2800	[20]

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