Amidoxime-Modified Chitosan for Pigment Red 224 Enrichment through Reversible Assembly

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1. Solubility of AO/MAc-CTS adsorbent in different solvents

Table S1. The condition of AO/MAc-CTS in different solvent environment.

Solvents	Solubility status	Solvents	Solubility status
Distilled water	No	CH_2Cl_2	No
5% aq. NaOH	No	DMF	No
5% aq. HCl	No	DMSO	No
methanol	No	pyridine	No

2. XPS analyses of typical materials

Table S2. The XPS spectra information of AN/MAc-CTS and AO/MAc-CTS.

	Element	Binding Energy(eV)	Assignment	Reference
AN/MAc-CTS	C 1s	285.50	*C*-H, *C*-C, *C*H_2-CH_2-C≡N	1-2
		286.63	*C*H_2-C≡N, CH_2-*C*≡N	
		287.72	*C*=O	
	N 1s	399.68	C≡*N*	1
		402.10	-*N*H_3^+	2
AO/MAc-CTS	C 1s	284.92	*C*H_2-CH_2-C(NH_2)=NOH, *C*H_2-C(NH_2)=NOH, *C*H_2-CH_2-C≡N	1-2
		286.33	*C*H_2-C≡N, CH_2-*C*≡N, *C*-O	
		287.44	CH_2-*C*(NH_2)=NOH, N-*C*=O	
	N 1s	399.44	*N*H_2-C=N-OH, C≡*N*	1
		400.74	NH_2-C=*N*-OH	

3. The effect of pH on the enrichment of pigment red 224

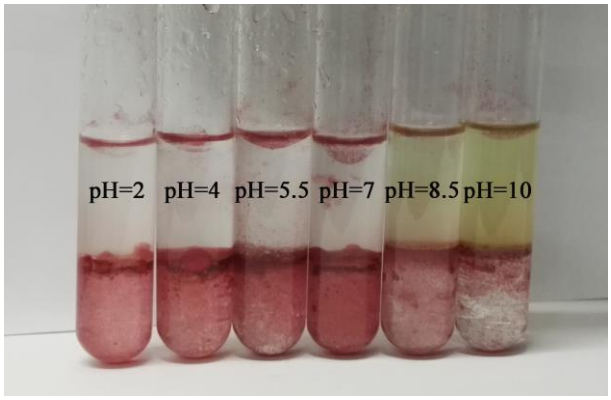


Fig. S1. The effect of pH on the enrichment of pigment red 224. The experiment condition are that *n*(Pigment red 224):*n*(AO/MAc-CTS) = 1:4 and T=20 ºC.

4. Interaction between AO/MAc-CTS and pigment red 224

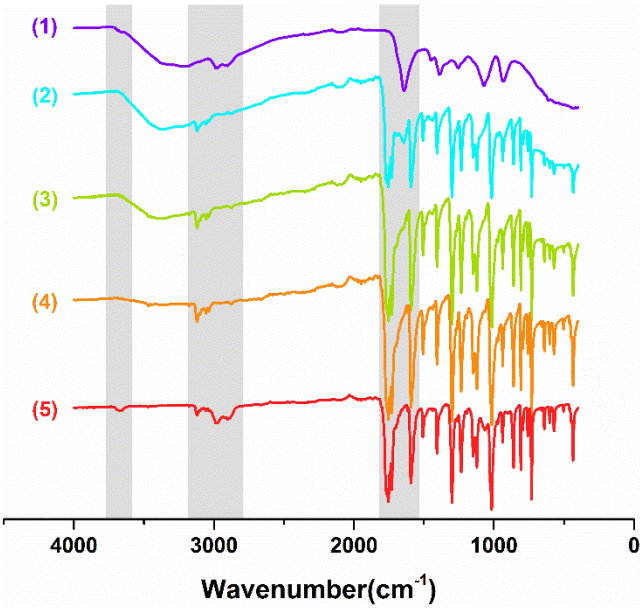
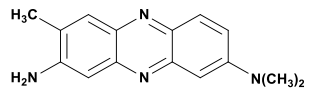
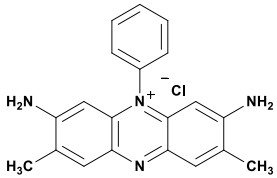
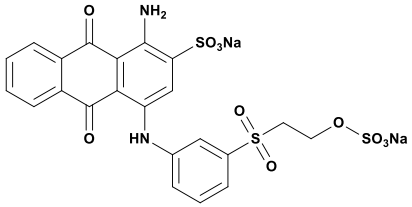


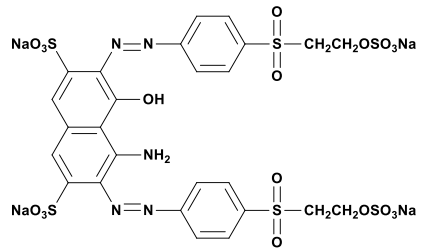
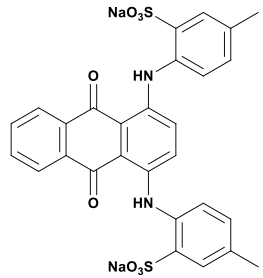
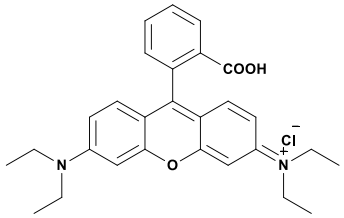
Fig. S2. FTIR spectra of AO/MAc-CTS (1), pigment red 224 adsorbed on AO/MAc-CTS in varying mole ratio (*n*(AO/MAc-CTS): *n*(Pigment red 224) = 6:1, 1:1 and 1:6 corresponding to (2) - (4) respectively, and pigment red 224 (5).

5. Comparison of dye adsorption performance with other advanced materials

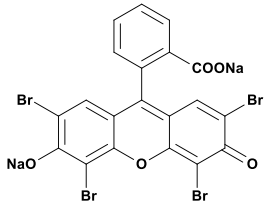
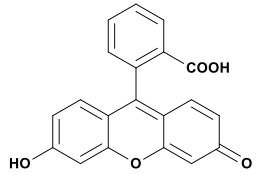
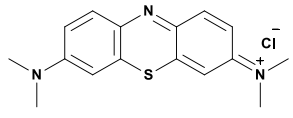
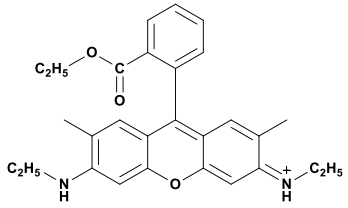
Table S3. Comparison with typical state-of-the-art materials for the treatment of cationic, anionic and neutral dyes which are similar with the structure of PTCDA.

Sample	Solvent	Dye object	T (°C)	pH	Q_e (mg/g)	Ref.
Magnetic multi-wall carbon nanotube nanocomposite	-	 Neutral Red	25	7	20.51	3
Activated carbon prepared by burning-off powder medium density fibreboard with 33min	Water		25	5	50	4
Metal-organic framework $[(CH_3)_2NH_2]_2[Cu_3O(SO_4)_3Cu_2L_2(DMF)(H_2O)]\cdot 9DMF$	Ethanol		Room temperature (RT)	-	132	5
Fe_3O_4 nanoparticles	Water	 Safranin O	30	6	96.94	6
Cucurbit[6]uril	DMF	 Reactive Blue 19	25	7	100.5	7
Glycidyl methacrylate- modified chitosan radically copolymered with methyl methacrylate	Water		30	7	189	8

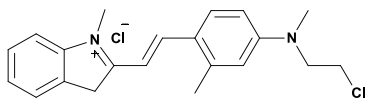
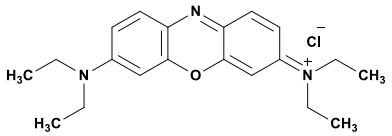
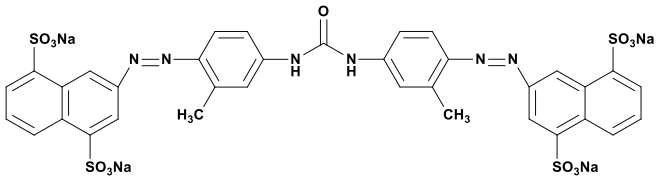
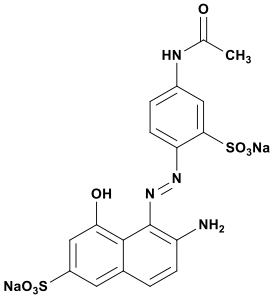
Continued Table S3

Sample	Solvent	Dye object	T (°C)	pH	Q_e (mg/g)	Ref.
Microalgae immobilized by polysulfone nanofibrous web	Water	 Remazol Black 5	23	6	36.5	9
Cross-linked amino-starch	Water	 Acid Green 25	25	4	245.42	10
Magnetic nanoparticles modified with aminoguanidine	Water		25	1.3	121.1	11
Phase-selctive gelators methyl 4,6-O-[(4-methylphenyl)methylene]-2,3-di-O-hexadecanoyl-a-D-glucopyranoside	Water	 Rhodamine B	RT	-	24	12

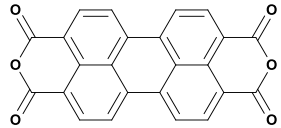
Continued Table S3

Sample	Solvent	Dye object	T (°C)	pH	Q_e (mg/g)	Ref.
Graphene oxide-chitosan hydrogel	Water	 Eosin Y	21	7	326	13
Hyperbranched poly(ether amine) nanogel/chitosan	Water	 Fluorescein	25	-	2.39	14
Amidoximated poly(acrylonitrile) particles	Water	 Methylene Blue	RT	-	90.53	15
		 Rhodamine 6 G			74.17	

Continued Table S3

Sample	Solvent	Dye object	T (°C)	pH	Q_e (mg/g)	Ref.
Starch/acrylonitrile-amidoxime	Water	 Basic Violet 7	25	7	7.3	16
		 Basic Blue 3			7.2	
		 Direct Yellow 50			2.1	
		 Acid Red 37			3.1	

Continued Table S3

Sample	Solvent	Dye object	T (°C)	pH	Q_e (mg/g)	Ref.
AO/MAc-CTS	H_2O -$CHCl_3$	 PTCDA	10	7	315.79	This work

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