Supplementary Material

Table S1 Information about the chemicals used in the experiment.

Name	Chemical Formula	Chemically Pure	Manufacturer
Sodium Borohydride	$NaBH_4$	> 99%	Tianjin Fuchen Chemical Company, Tianjin, China
Ferric Chloride Hexahydrate	$FeCl_3 \cdot 6H_2O$	> 97%	Tianjin Fuchen Chemical Company, Tianjin, China
Ethanol	C_2H_6O	> 99.5%	Tianjin Fuchen Chemical Company, Tianjin, China
Sodium Hydroxide	NaOH	> 99%	Tianjin Fuchen Chemical Company, Tianjin, China
Hydrochloric Acid	HCl	> 37%	Tianjin Fuchen Chemical Company, Tianjin, China
Carboxy-methyl-cellulose	CMC	MW = 90,000	Anpel Laboratory Technology, Shanghai, China
Potassium dichromate	$K_2Cr_2O_7$	> 99%	Fengchuan Chemical Technology, Tianjin, China

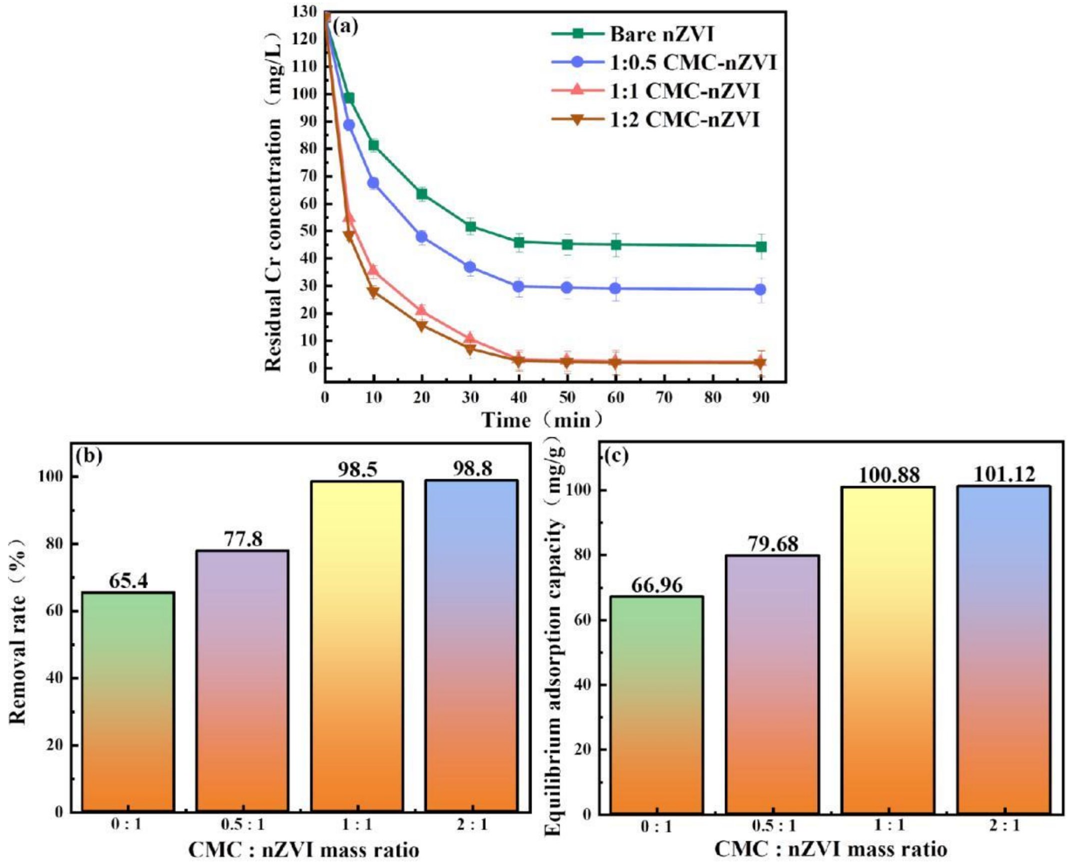


Figure S1 (a) Comparison of Cr(VI) removal using CMC-nZVI with various ratios (CMC: nZVI mass ratio). With a pH of 7, an initial Cr(VI) content of 128 $mg \cdot L^{-1}$, and a temper ature of 20 ℃, the dosage of nZVI and CMC-nZVI is 1.25g·L^{-1}; **(b)** Removal rate of different coated ratio; **(c)** Equilibrium adsorption of different coated ratio.

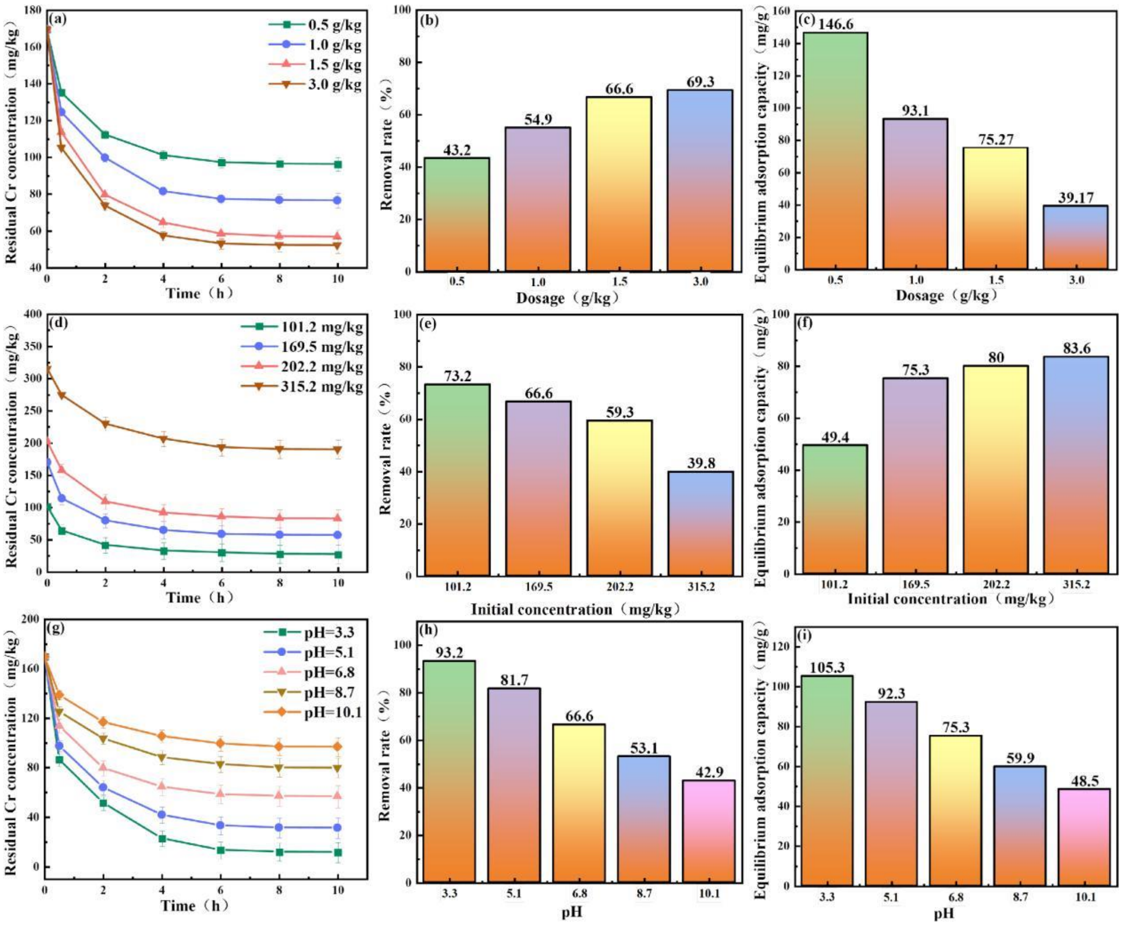


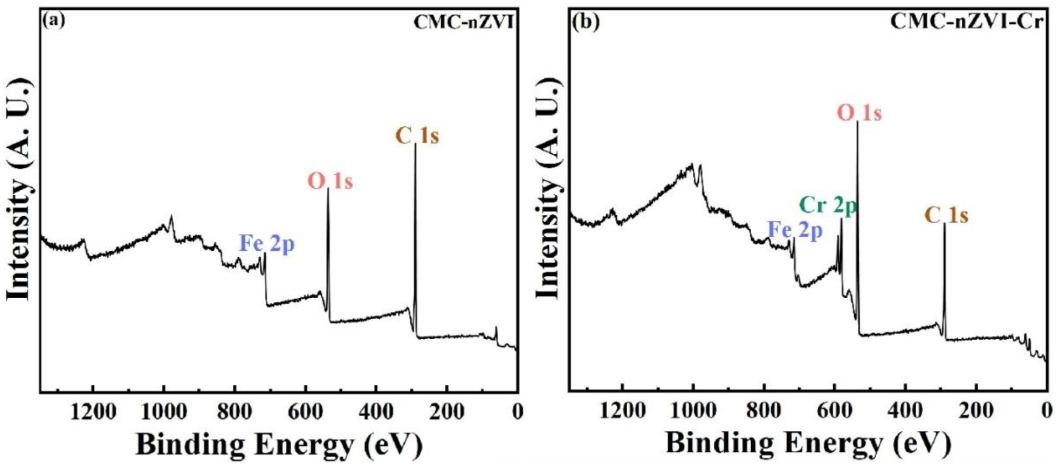
Figure S2 Effect of Different Factors on CMC-nZVI's Cr(VI) Removal. **(a)** Effect of dosage on Cr(VI) removal, with pH of 6.8, an initial Cr(VI) concentration of 169.5 mg·kg^{-1}, and temperature of 20 ℃; **(b)** Removal rate of different dosage; **(c)** Equilibrium adsorption of different dosage; **(d)** Effect of initial concentration on Cr(VI) removal, at the original pH (6.8) and temperature (20 ℃) using 1.5g·kg^{-1} CMC-nZVI; **(e)** Removal rate of different initial concentration; **(f)** Equilibrium adsorption of different initial concentration; **(g)** Effect of pH on Cr(VI) removal, in the context of 1.5 g·kg^{-1} CMC-nZVI with temperature of 20 ℃ and an initial Cr(VI) concentration of 169.5 mg·kg^{-1}; **(h)** Removal rate of different pH; **(i)** Equilibrium adsorption of different pH.

Table S2 Fitting results of the kinetic equation under different pH.

pH	$Q_{e,exp}$ (mg·g^{-1})	Pseudo-first-order kinetics equation $Q_{e, cal}$ (mg·g^{-1})	k_1 (min^{-1})	R^2	Pseudo-second-order kinetics equation $Q_{e, cal}$ (mg·g^{-1})	k_2 (g·mg^{-1}·min^{-1})	R^2
3.3	105.3	103.4	0.752	0.974	112.9	0.0140	0.997
5.1	92.3	68.6	0.751	0.955	98.7	0.0162	0.998
6.8	75.3	38.9	0.748	0.953	80.3	0.0206	0.998
8.7	59.9	22.8	0.722	0.951	64.7	0.0208	0.997
10.1	48.5	15.9	0.721	0.959	53.2	0.0209	0.998

Table S3 Isotherms parameters for Cr adsorption onto CMC-nZVI.

	Langmuir			Freundlich		
	q_{max}	K_L	R^2	K_F	n	R^2
Cr	123.465	0.0128	0.953	14.375	-0.325	0.910



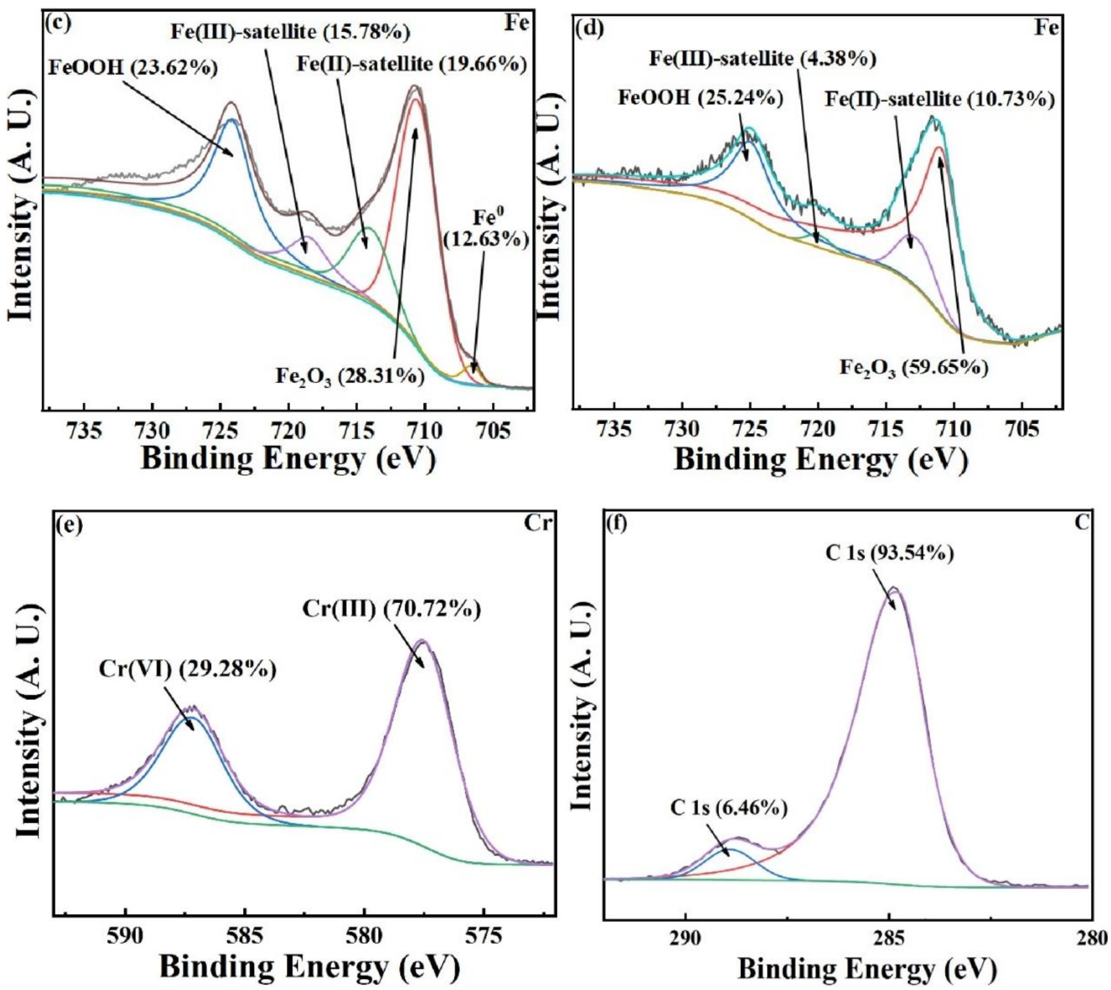


Figure S3 XPS Spectra of CMC-nZVI Before and After Cr(VI) Reaction. **(a)** and **(b)** show the XPS survey spectra of CMC-nZVI before and after the reaction with Cr(VI); **(c)** and **(d)** display the XPS spectra of iron (Fe) for CMC-nZVI before and after the reaction with Cr(VI); **(e)** and **(f)** XPS spectra of Cr and C after Reaction of CMC-nZVI with Cr(VI).