

Supplementary information

For

Waste glass fiber fabric as a support for facile synthesis of microporous carbon to adsorb Cr(VI) from waste water

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S1 Adsorption kinetics

The result obtained by fitting the adsorption data with the Langmuir⁵⁰, Freundlich⁵¹ and Temkin⁵² models are listed in Table S1. In the equations in Table S1, C_e (mg/L), q_e (mg/g), q_m and K_L are the concentration of Cr in solution, the amount of adsorbed Cr at equilibrium, Langmuir constants related to adsorption capacity (mg/g) and the energy of adsorption (L/g), respectively. K_F and $1/n$ are the Freundlich constants related to sorption capacity and sorption intensity, respectively. K_t is the equilibrium binding constant (L/mol) corresponding to the maximum binding energy and constant B is related to the heat of sorption.

Table S1. Freundlich, Langmuir and Temkin isotherm constants for Cr adsorption on AC@GFF

Analyte	Isotherms		
	<i>Langmuir</i>	<i>Freundlich</i>	<i>Temkin</i>
Formula	$\frac{C_e}{q_e} = \frac{1}{q_m K_L} + \frac{C_e}{q_m}$	$\lg q_e = \lg K_F + \frac{1}{n} \lg C_e$	$q_e = B \ln K_t + B \ln C_e$
	$y = 0.1333x + 0.9766$	$y = 0.5801x - 0.035$	$y = 1.3406x + 1.1102$
Cr(VI)	$q_m = 7.5019$	$K_F = 0.9226$	$K_t = 2.2890$
	$K_L = 0.1365$	$1/n = 0.5801$	$B = 1.3406$
	$R^2 = 0.9839$	$R^2 = 0.9207$	$R^2 = 0.9750$

S2 Adsorption isotherms

In the present study, the data were fitted with pseudo-first-order⁵⁴, pseudo-second-order⁵⁵ and intra-particle-diffusion⁵⁶ kinetic models. And the results are listed in Table S2. In the equations, q_e and q_t refer to the amount of Cr(VI) (mg/g) at equilibrium and at any time, respectively. K_1 and K_2 are the equilibrium rate constants of pseudo-first-order and pseudo-second-order adsorption (min^{-1}), respectively. C is the intercept and K_{id} is the intra-particle diffusion rate constant.

Table S2. The Pseudo-first-order, Pseudo-second-order and Intra-particle-diffusion kinetic modeling constants for Cr adsorption on AC@GFF

Analyte	Pseudo-first-order		Pseudo-second-order		Intra-particle-diffusion	
Formula	$\ln(q_e - q_t) = \ln(q_e) - k_1 t$		$\frac{t}{q_t} = \frac{1}{k_2 q_e^2} + \frac{t}{q_e}$		$q_t = k_{id} t^{\frac{1}{2}} + C$	
	y = -0.0017x + 3.7914		y = 0.0304x + 4.1497		y = 1.4381x - 1.2178	
Cr(VI)	K ₁	R ²	K ₂	R ²	K _{id}	R ²
	0.0017	0.9201	0.0002	0.9814	1.4381	0.9627