Supplementary material



**Fig.S1** The zeta potential value of the N/Fe-CNTs.



**Fig.S2** The calculated result of -COOH, -OH, and graphitic N interactions with Cr(VI).

**Table S1 Adsorption kinetic models and main parameters.**

|  |  |  |
| --- | --- | --- |
| **Kinetic models** | **Equation** | **Main parameters** |
| Pseudo-first order |  | K1 means adsorption rate constant (1/min). |
| Pseudo-second order |  | K2 is adsorption rate constant (1/min). |
| Intraparticle diffusion |  | K3 means rate constant (mg/g min1/2). C is a constant. |

**Table S2 Adsorption isotherm models and main parameters**

|  |  |  |
| --- | --- | --- |
| Isotherms | Equations | Parameters |
| Langmuir | $$q\_{e}=\frac{k\_{L}q\_{m}C\_{e}}{1+k\_{L}C\_{e}}$$ | qm means the adsorption amount (mg/g).kL (L/mg) is coefficient. |
| Freundlich | $$q\_{e}=k\_{F}C\_{e}^{1/n}$$ | kF is adsorption constant (mg/g). (L/mg)1/n, 1/n is adsorption intensity |
| Hill | $$qe=\frac{QmCe^{n}}{C^{n}+Ce^{n}}$$ | Qm is the maximumadsorption capacity (mg/g) , n and C are the number of ions per site and semi saturated concentration, respectively. |
| Temkin | $$q\_{e}=B\_{T}lnK\_{T}+B\_{T}lnC\_{e}$$  | $B\_{T}$ is adsorption heat, J/mol$K\_{T}$ is binding equilibrium, L/g  |

**Table S3 The Cr(Ⅵ) adsorption capacity of various adsorbents.**

|  |  |  |  |
| --- | --- | --- | --- |
| Adsorbents  | qm (mg g-1) | BET surface (m2 g−1) | References |
| N/Fe-CNTs | 27.47 | 158.71 | This study |
| MAG | 14.7 | 311 | [[1](#_ENREF_1)] |
| Corncob activated carbon | 9.98 | 826.6 | [[2](#_ENREF_2)] |
| Bamboo bark-based AC | 19.53 | 1068 | [[3](#_ENREF_3)] |
| BCS, BCW | 24.6, 23.6 | 26.3, 11.4 | [[4](#_ENREF_4)] |
| BC-Fe, BC-Fe-U | 16.3, 14.7 | 163, 117 | [[5](#_ENREF_5)] |
| Coconut shell based AC | 54 | 1022.4 | [[6](#_ENREF_6)] |

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