# Supplementary Material

## Adsorption property and mechanism of glutaraldehyde-crosslinked chitosan for removal of 2,4-dichlorophenoxyacetic acid from water

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# Captions

Fig. S1 Synthetic routes for the preparation of GCC

Fig. S2 $^{13}$C NMR spectra of chitosan and GCC

Fig. S3 Influence of ionic strength on 2,4-D adsorption capacity (adsorbent dosage: 1000 mg/L; C0: 200 mg/L; pH: 3.0; 25 ℃)

Table S1 BET analysis of chitosan and GCC

Table S2 Kinetic parameters of intraparticle diffusion model for the adsorption of 2,4-D onto GCC

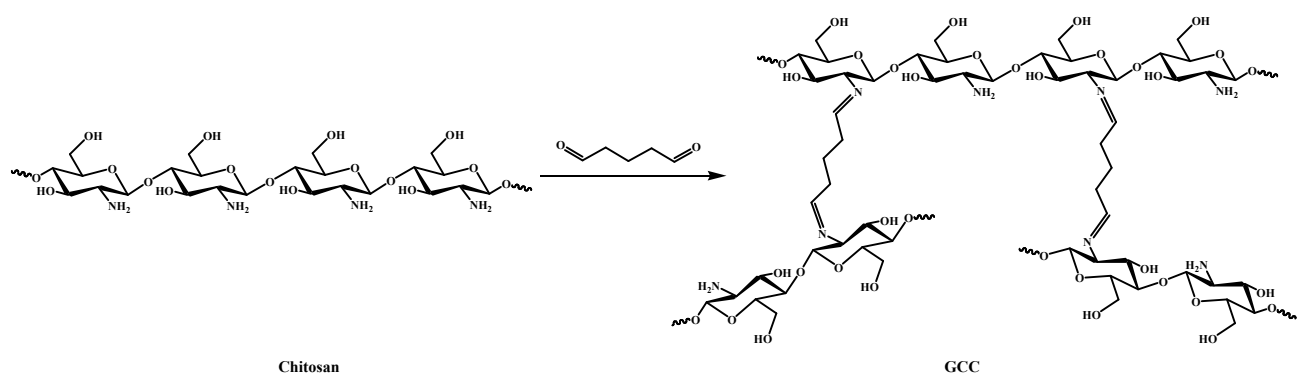Table S3Thermodynamic parameters for the adsorption of 2,4-D onto the GCC
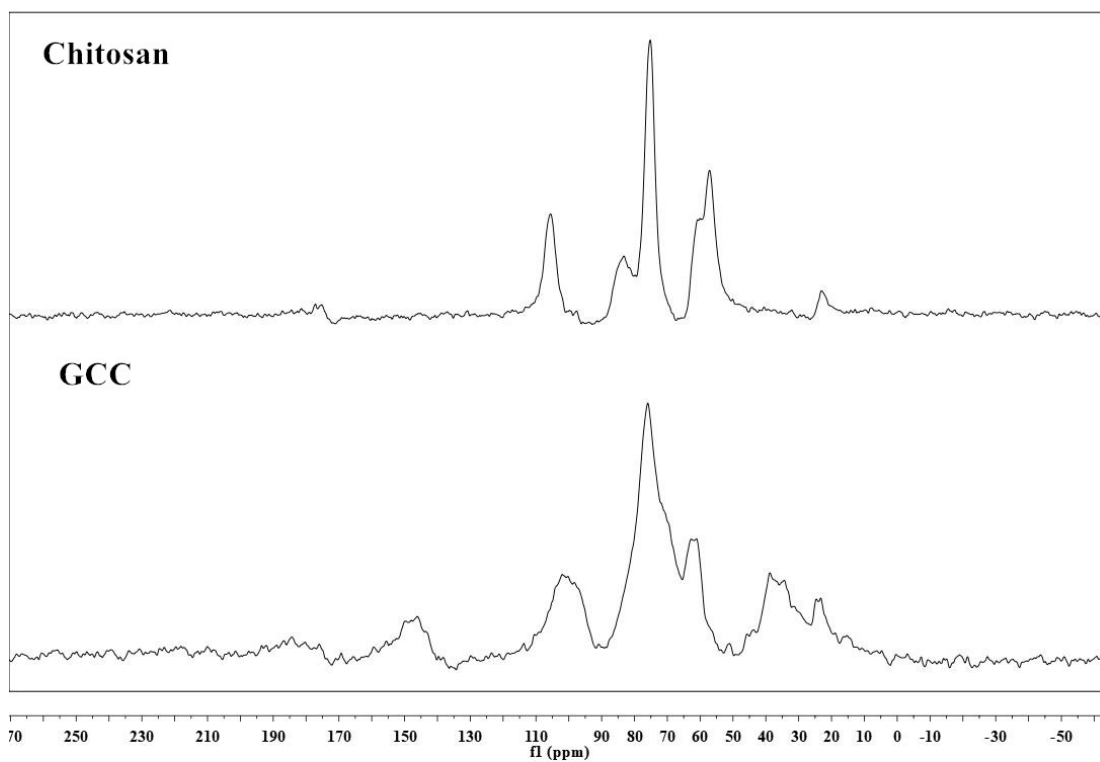
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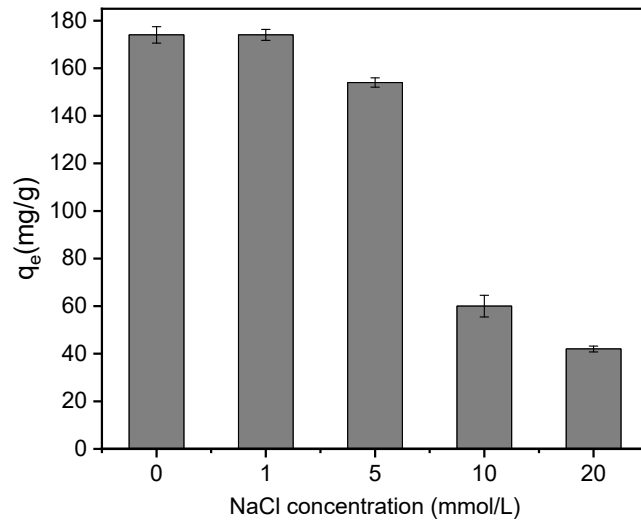
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Table S1 BET analysis of chitosan and GCC

| Parameters | Chitosan | GCC |
| --- | --- | --- |
| BET surface area ($m^2/g$) | 1.0673 | 3.4158 |
| Langmuir surface area ($m^2/g$) | 0.9890 | 3.6750 |
| BJH adsorption average pore diameter (nm) | 21.42 | 7.54 |

Table S2 Kinetic parameters of intraparticle diffusion model for the adsorption of 2,4-D onto the GCC

| $C_0$ (mg/L)* | Kinetic Models and Parameters | | | | | | | | | | | | | | |
| | The first linear part | | | | | The second linear part | | | | | The third linear part | | | | |
| | $k_{d1}$ | $C$ | $R^2$ | $R^2$ (adj) | $SE$ | $k_{d2}$ | $C$ | $R^2$ | $R^2$ (adj) | $SE$ | $k_{d3}$ | $C$ | $R^2$ | $R^2$ (adj) | $SE$ |
| 250 | 36.637 | 59.383 | 0.981 | 0.962 | 5.175 | 10.781 | 139.953 | 0.964 | 0.927 | 2.094 | 1.692 | 190.199 | 0.746 | 0.619 | 0.698 |
| 200 | 31.794 | 47.166 | 0.975 | 0.949 | 5.132 | 8.226 | 120.224 | 0.961 | 0.921 | 1.666 | 1.000 | 159.383 | 0.884 | 0.826 | 0.256 |
| 150 | 22.606 | 44.592 | 0.963 | 0.926 | 4.443 | 5.236 | 98.125 | 0.948 | 0.896 | 1.227 | 0.631 | 123.046 | 0.879 | 0.818 | 0.166 |
| 100 | 15.929 | 26.866 | 0.961 | 0.921 | 3.229 | 3.610 | 64.883 | 0.926 | 0.851 | 1.024 | 0.869 | 78.998 | 0.985 | 0.978 | 0.076 |
| 50 | 8.0719 | 20.818 | 0.946 | 0.892 | 1.931 | 0.867 | 42.782 | 0.964 | 0.929 | 0.167 | 0.095 | 47.031 | 0.751 | 0.627 | 0.039 |

* $T$=25 ℃, pH=3, $C_{adsobent}$ =1000 mg/L

Table S3 Thermodynamic parameters for the adsorption of 2,4-D onto the GCC

| $C_0$ (mg/L) | Temperature (℃) | $\Delta G^o$(kJ/mol) | Regression equation | $\Delta S^o$(J/mol*k) | $\Delta H^o$(kJ/mol) | $R^2$ |
|---|---|---|---|---|---|---|
| 200 | 25 | -21.88 | y = 1310.4x + 4.4176 | 36.73 | -10.89 | 0.951 |
| | 35 | -22.11 | | | | |
| | 45 | -22.62 | | | | |
| 100 | 25 | -23.07 | y = 1322.6x + 4.8642 | 40.44 | -11.0 | 0.988 |
| | 35 | -23.41 | | | | |
| | 45 | -23.88 | | | | |
| 50 | 25 | -24.76 | y = 2415.1x + 1.8831 | 15.66 | -20.08 | 0.999 |
| | 35 | -24.87 | | | | |
| | 45 | -25.07 | | | | |