# Supplementary Material

Table S1. Yield, Elemental Composition and Ratios, Ash Content, BET-$N_2$ Surface Area (SA) of Studied Biochar R350−R550

| Sample | Yield(%) | ash(%) | C(%) | H(%) | N(%) | O(%) | H/C | (N+O)/C | BET SA ($m^2/g$) |
|---|---|---|---|---|---|---|---|---|---|
| R350 | 40.83 | 28.12 | 53.52 | 3.02 | 0.59 | 14.02 | 0.056 | 0.273 | 8.23 |
| R450 | 39.01 | 31.50 | 56.33 | 2.28 | 0.66 | 8.54 | 0.040 | 0.163 | 14.07 |
| R550 | 36.93 | 33.96 | 57.31 | 1.62 | 0.53 | 6.03 | 0.028 | 0.114 | 140.71 |

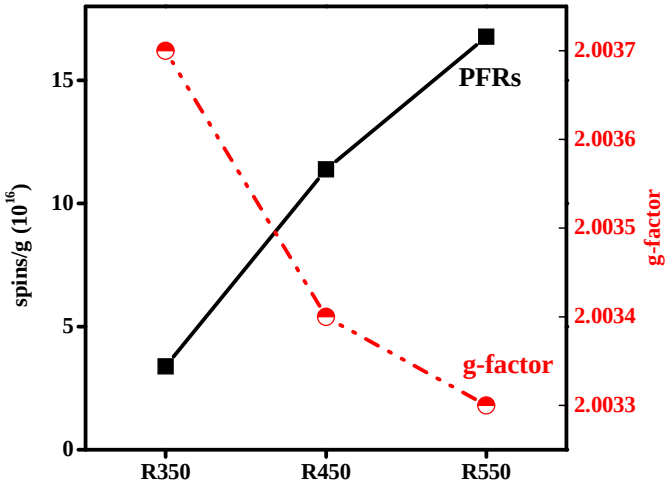


Fig. S1 Changes in PFRs concentration and g-factor as a function of pyrolysis temperatures.

Table S2 Relative percentage of different Cr on biochar after Cr(VI) treatment

| Biochar | $Cr_2O_7^{2-}$ | $Cr(OH)_3$ | $Cr_2O_3$ |
|---|---|---|---|
| R350 | 12.82% | 85.03% | 2.15% |
| R450 | 6.39% | 8.98% | 84.64% |
| R550 | 18.45% | 77% | 4.55% |

Table S3. Elemental Composition and Ratios, Ash Content, BET-$N_2$ Surface Area (SA) of Studied Biochar R550 and 5%-R550

| Sample | Ash(%) | C(%) | H(%) | N(%) | O(%) | H/C | (N+O)/C | BET SA ($m^2/g$) |
|---|---|---|---|---|---|---|---|---|
| R550 | 33.96 | 57.31 | 1.62 | 0.53 | 6.03 | 0.028 | 0.114 | 140.71 |
| 5%-R550 | 32.90 | 50.87 | 2.32 | 0.55 | 13.36 | 0.046 | 0.273 | 145.82 |

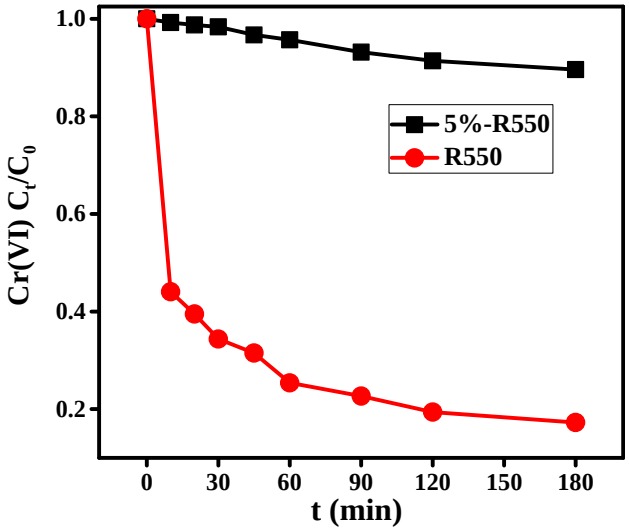


Fig. S2 Cr(VI) removal kinetics in biochar suspension. Reaction condition: [biochar] = 10 g/L, [Cr(VI)]0 = 50 mg/L, pH = 3.

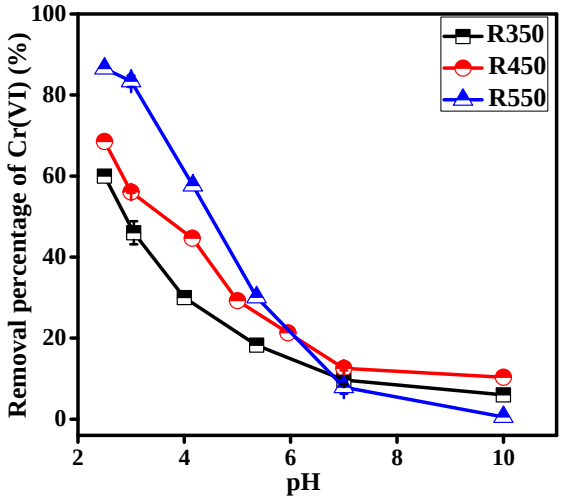


Fig. S3 Effect of pH on Cr(VI) removal efficiency. Reaction condition: [biochar] = 10 g/L, [Cr(VI)]0 = 50 mg/L, [Reaction time] = 48 h, pH varied from 2.5 to 10.

Table S4. Distribution of Cr in solution and on biochar upon Cr(Ⅵ) treatment

| Biochar | $Cr(Ⅵ)_{sol}$ (mg/L) | $Cr(Ⅲ)_{sol}$ (mg/L) | $Cr_{bio}$ (mg/g) | $Cr(Ⅲ)_{bio}$ (mg/g) | $Cr(Ⅲ)_{total}$ (mg/L) |
|---|---|---|---|---|---|
| R350 | 26.38 | 9.13 | 1.45 | 1.26 | 21.73 |
| R450 | 15.40 | 3.38 | 3.12 | 2.92 | 32.58 |
| R550 | 6.67 | 3.34 | 3.99 | 3.25 | 35.84 |

Notes: sol means solution and bio means biochar.