1. Chromatogram of BaP and calibration curve determined by HPLC (Agilent 1200)

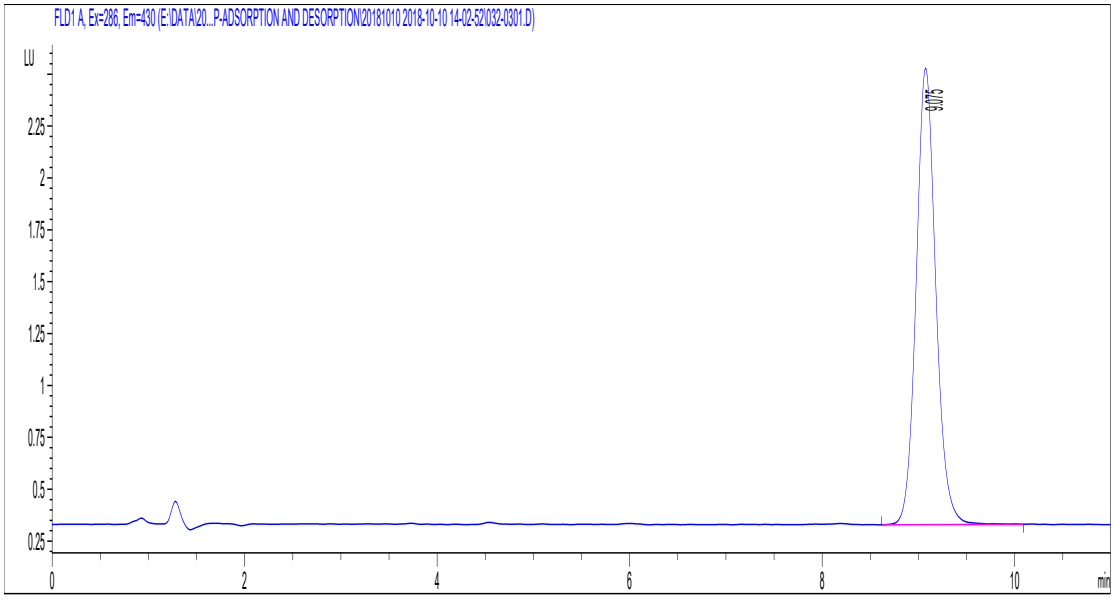

Fig.S1 the chromatogram of BaP

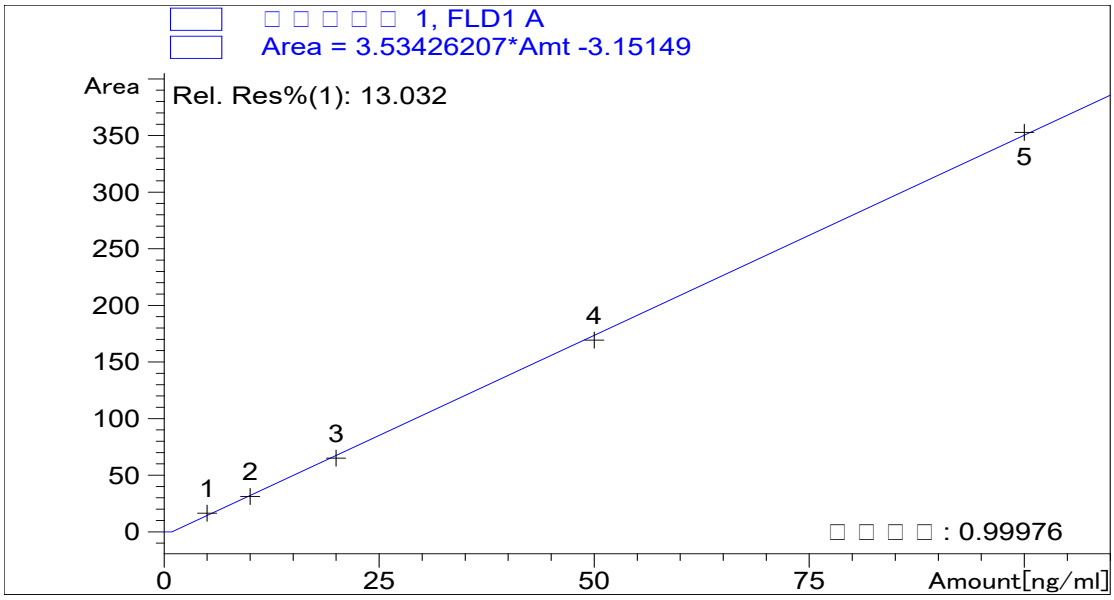

Fig.S2 The calibration curve of BaP

2. Adsorption mechanism equation

2.1 First order dynamic equation

$$q_t = q_e\left(1 - e^{-k_1 t}\right) \qquad \text{(Eq. S1)}$$

Where, q_t is amount of adsorption at time t, q_e is adsorption amount at equilibrium, t is experimental time (in mins) and k_1 is reaction rate constant.

2.2 Second order dynamic equation

$$\frac{t}{q_t} = \frac{1}{k_2 q_e^2} + \frac{1}{q_e} t \qquad \text{(Eq. S2)}$$

Where, q_t, $q_e$and t stands for the same thing as Eq.1, k_2 is the second order kinetic rate constant.

2.3 Intra particle diffusion equation

$$q_t = k_t t^{\frac{1}{2}} + c \qquad \text{(Eq. S3)}$$

Where k_t is intra particle diffusion rate constant and c is the constant related to the thickness and boundary of the adsorbent.

2.4 Langmuir equation

$$\frac{1}{q_e} = \frac{1}{q_m} + \frac{1}{k_l q_m c_e} \qquad \text{(Eq. S4)}$$

Where q_e is the concentration of adsorbents per unit mass, c_e is the concentration of equilibrium solution, q_m represents the maximum adsorption capacity of adsorbent monolayer, and the adsorption coefficient k_l represents the adsorption surface strength constant.

2.5 Freundlich equation

$$\lg c_s = \lg k_f + {}^{1}\!/_{n} \lg c_e \qquad \text{(Eq. S5)}$$

where c_s is the mass concentration of adsorption, c_e is the concentration of equilibrium solution, k_f is the constant of the model and ${}^{1}\!/_{n}$ reflects the degree of nonlinearity of adsorption.

2.6 Temkin equation

$$q_e = B_T \ln {}^{K}\!/_{A} + B_T \ln c_e \qquad \text{(Eq. S6)}$$

Where B_T is the adsorption coefficient of heat of adsorbent (J/mole), A is the reciprocal of the adsorption coefficient, K is slope, T is the experimental temperature (298K) and R is the real value of gas constant (8.314J/mole/K) respectively.

3 Graph of the fitting equation

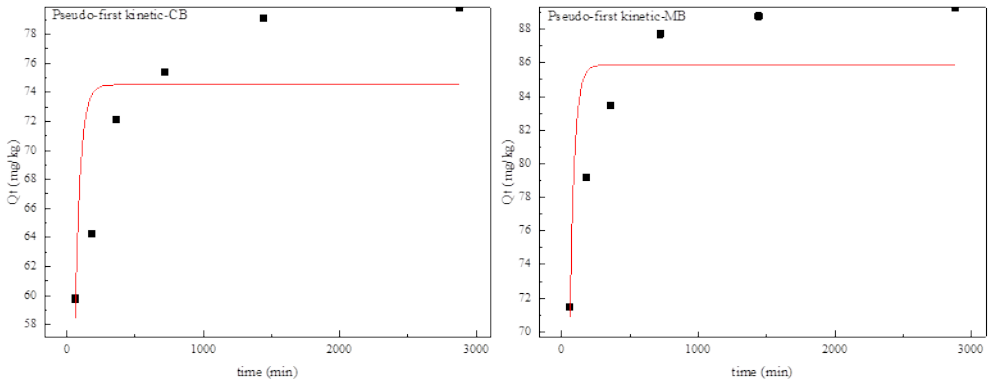

Fig.S3 Pseudo-first kinetic dynamic equation fitting curve

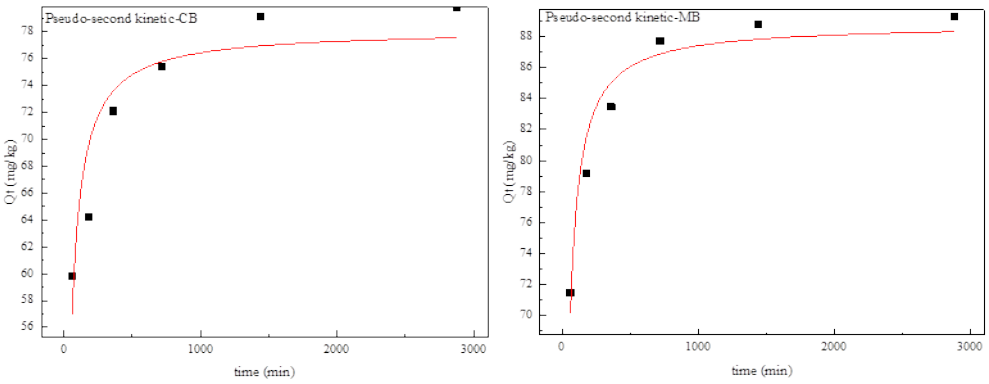

Fig.S4 Pseudo-second kinetic dynamic equation fitting curve

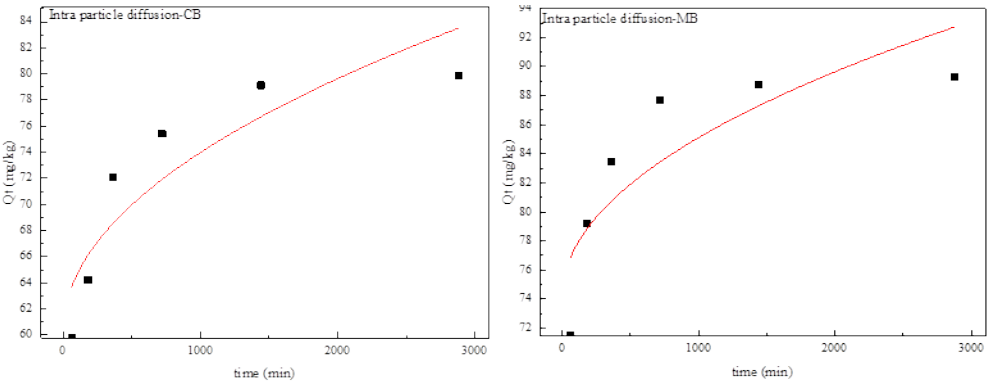

Fig.S5 Intra particle diffusion equation fitting curve

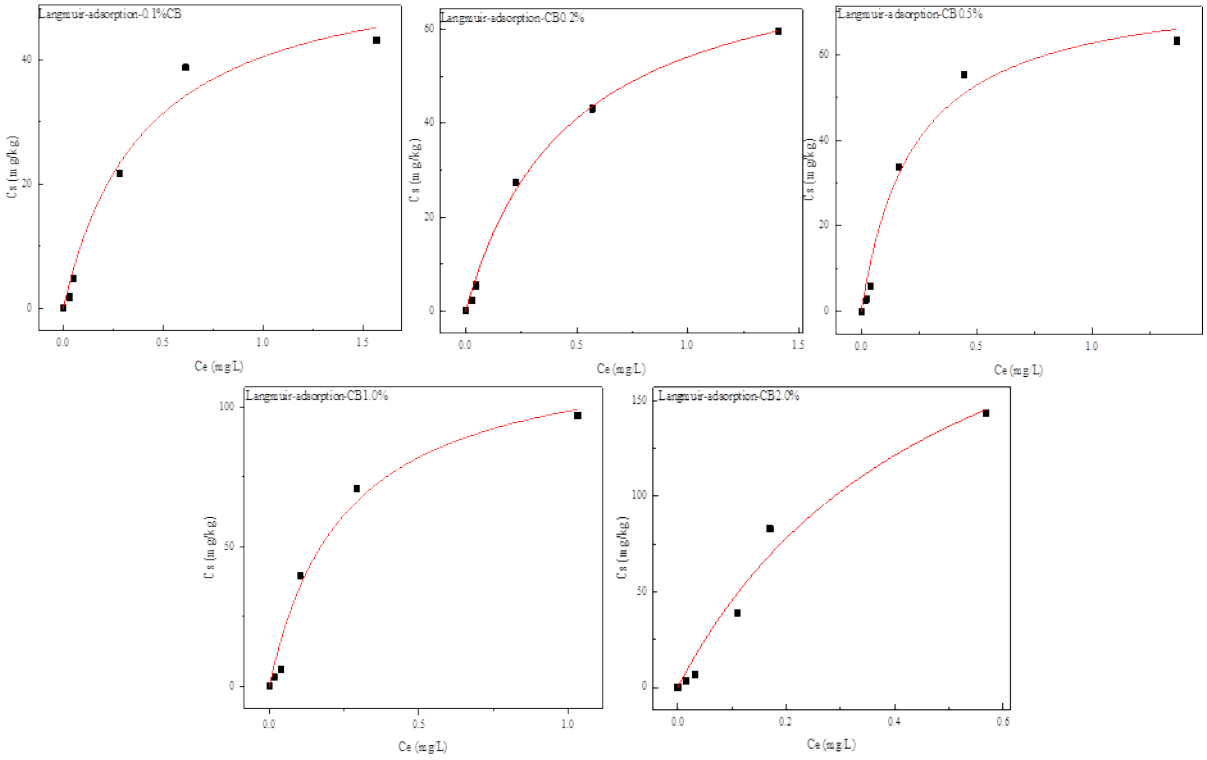

Fig.S6 Langmuir adsorption isotherm fitting curve of CB Biochar soil

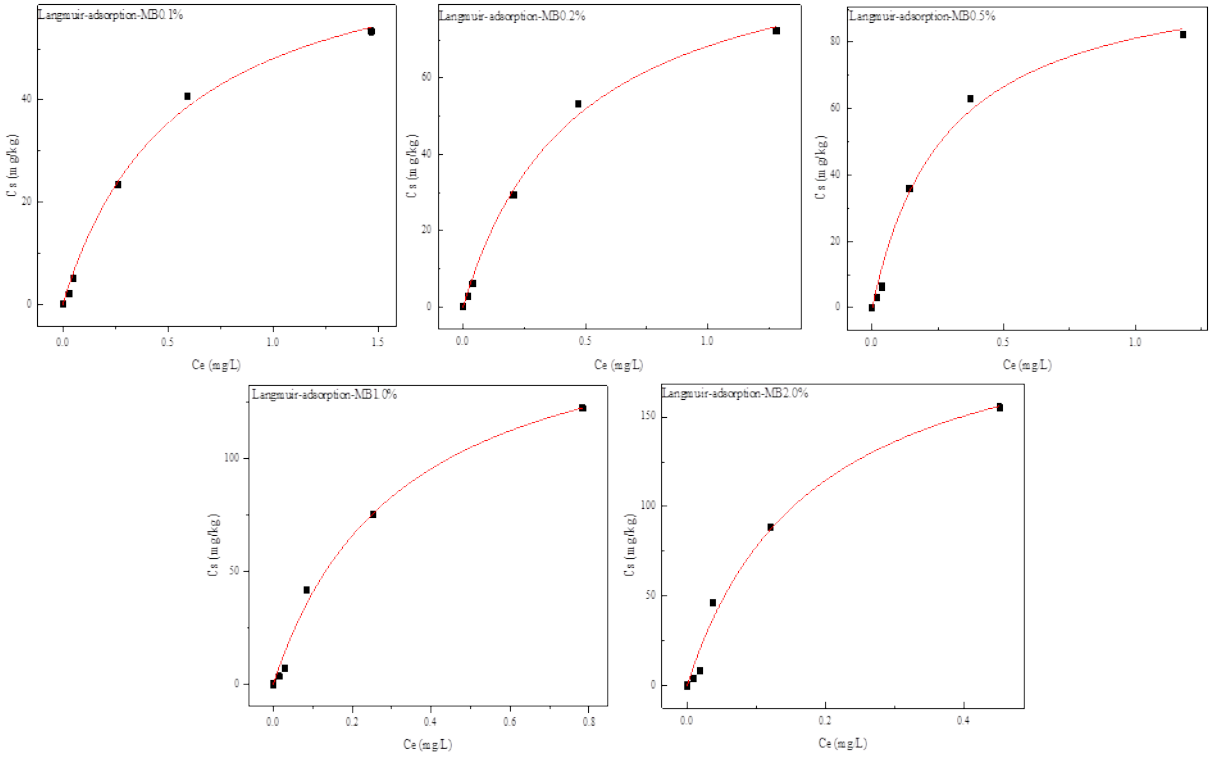

Fig.S7 Langmuir adsorption isotherm fitting curve of MB Biochar soil

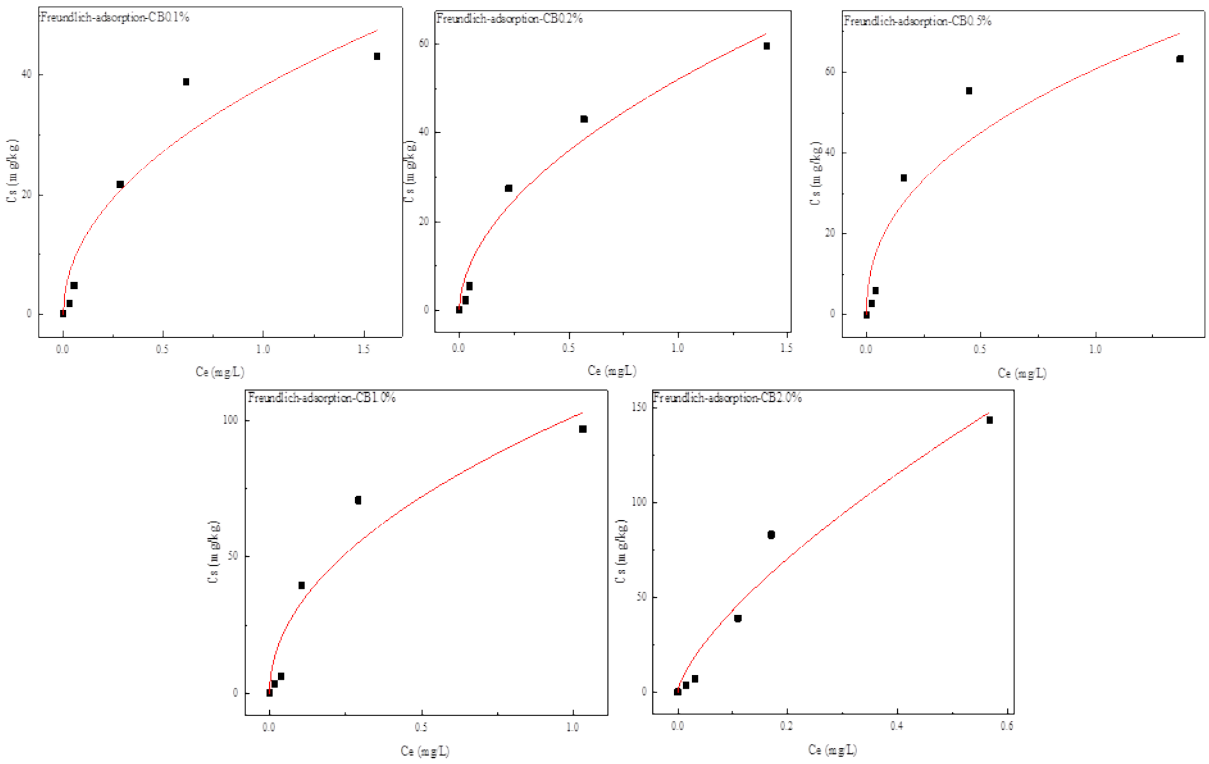

Fig.S8 Freundlich adsorption isotherm fitting curve of CB Biochar soil

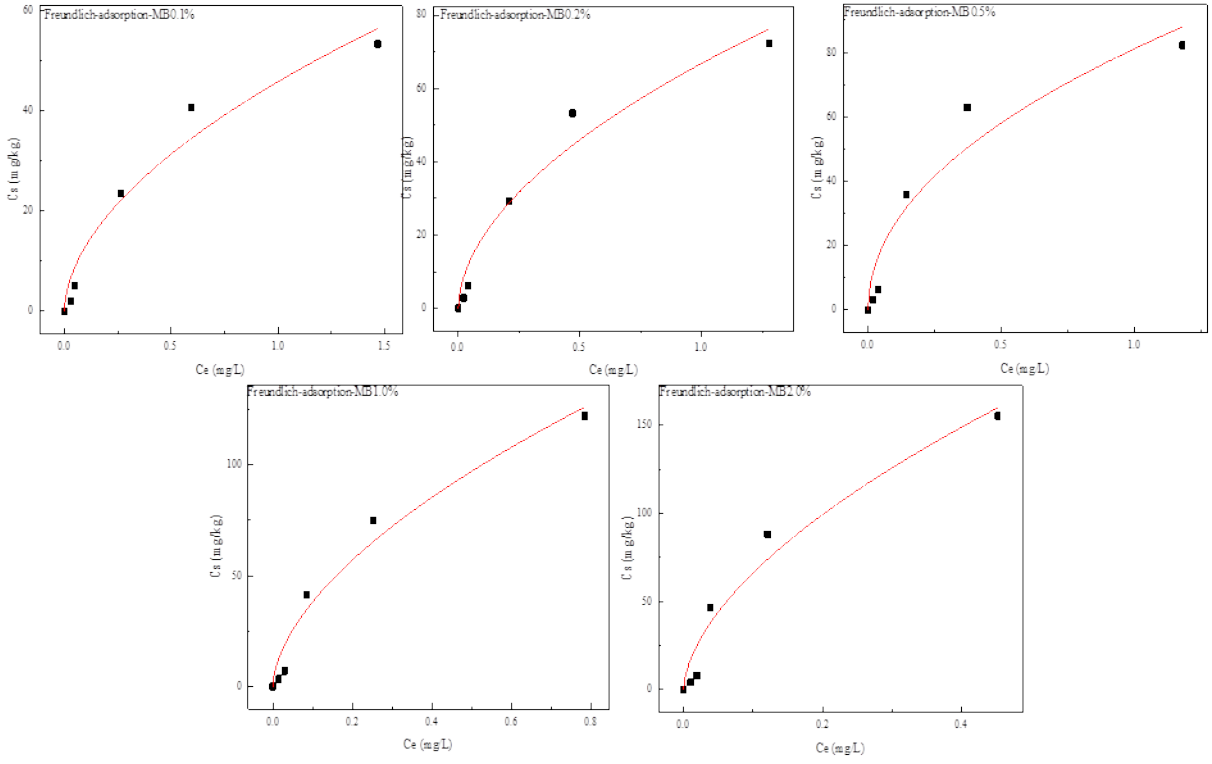

Fig.S9 Freundlich adsorption isotherm fitting curve of MB Biochar soil

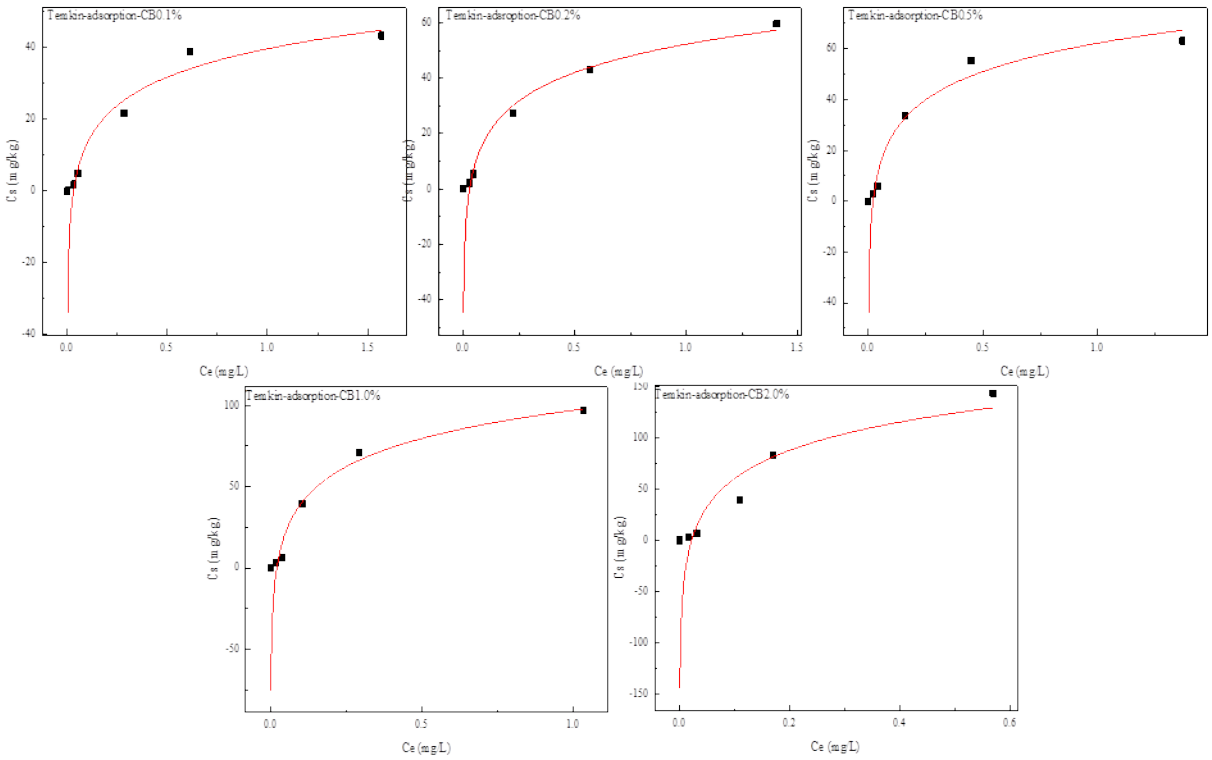

Fig.S10 Temkin adsorption isotherm fitting curve of CB Biochar soil

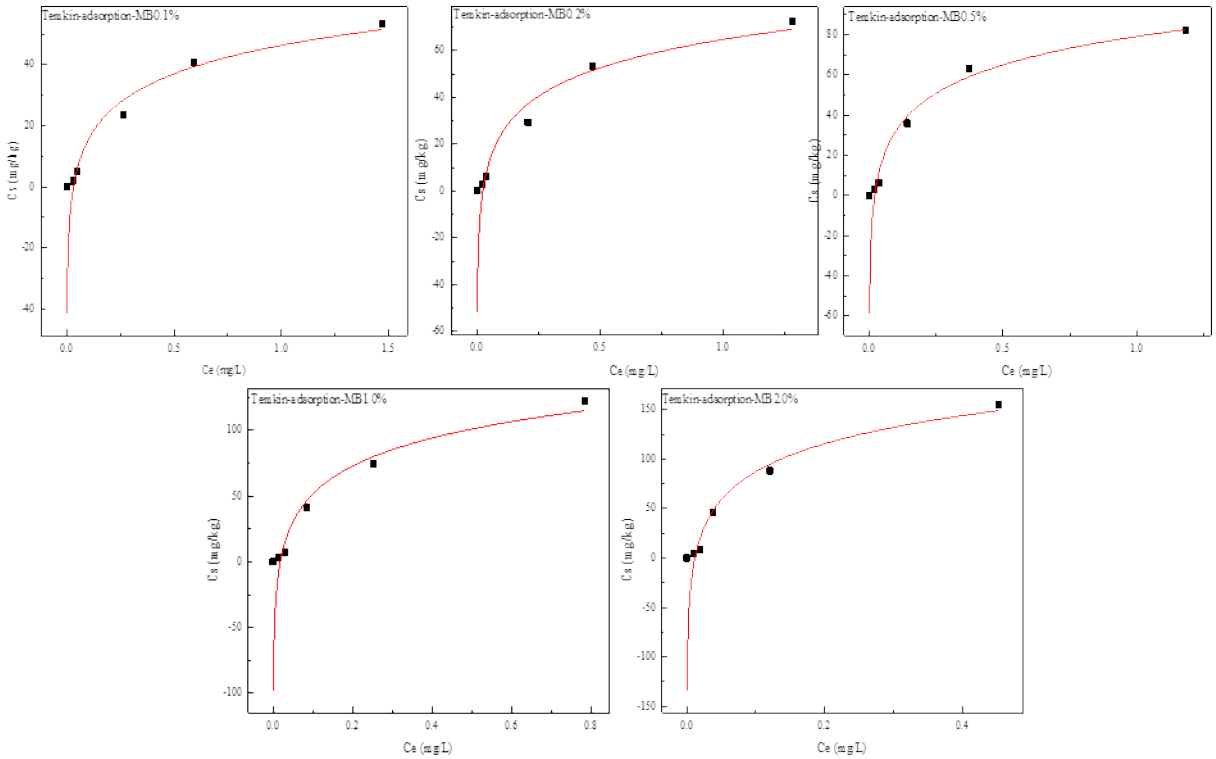

Fig.S11 Temkin adsorption isotherm fitting curve of MB Biochar soil

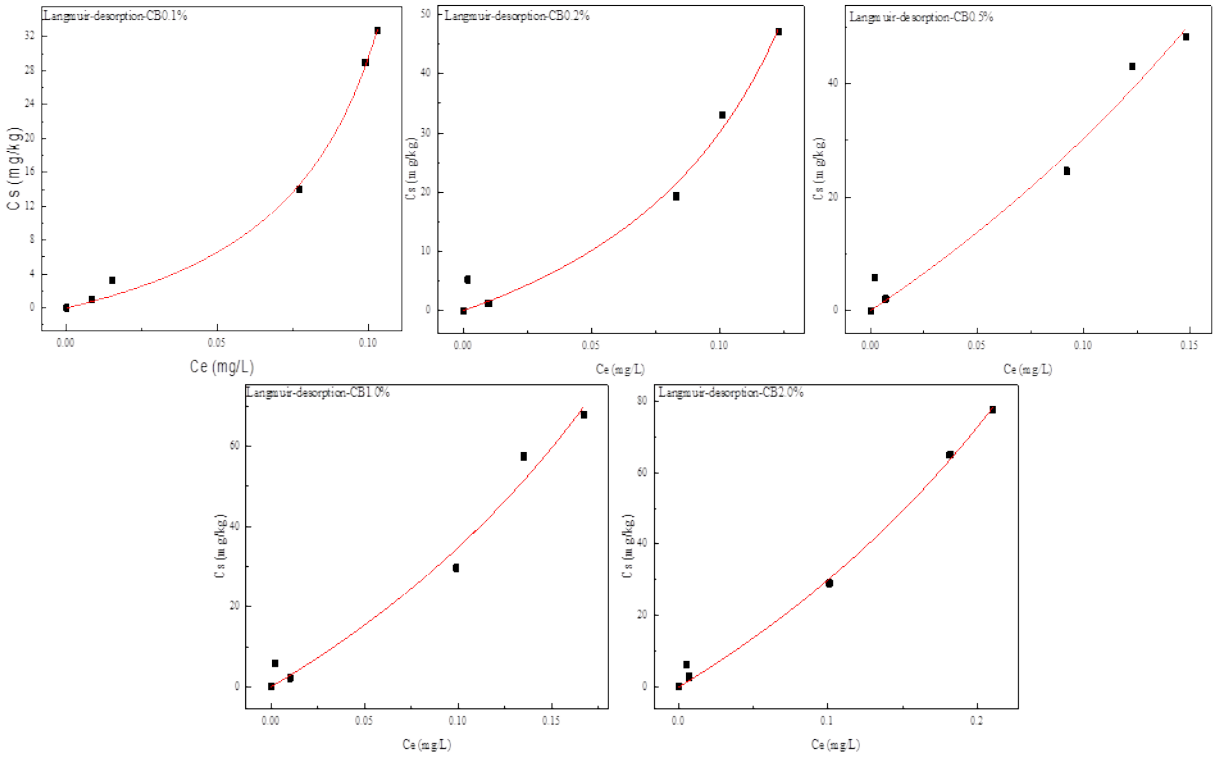

Fig.S12 Langmuir desorption isotherm fitting curve of CB Biochar soil

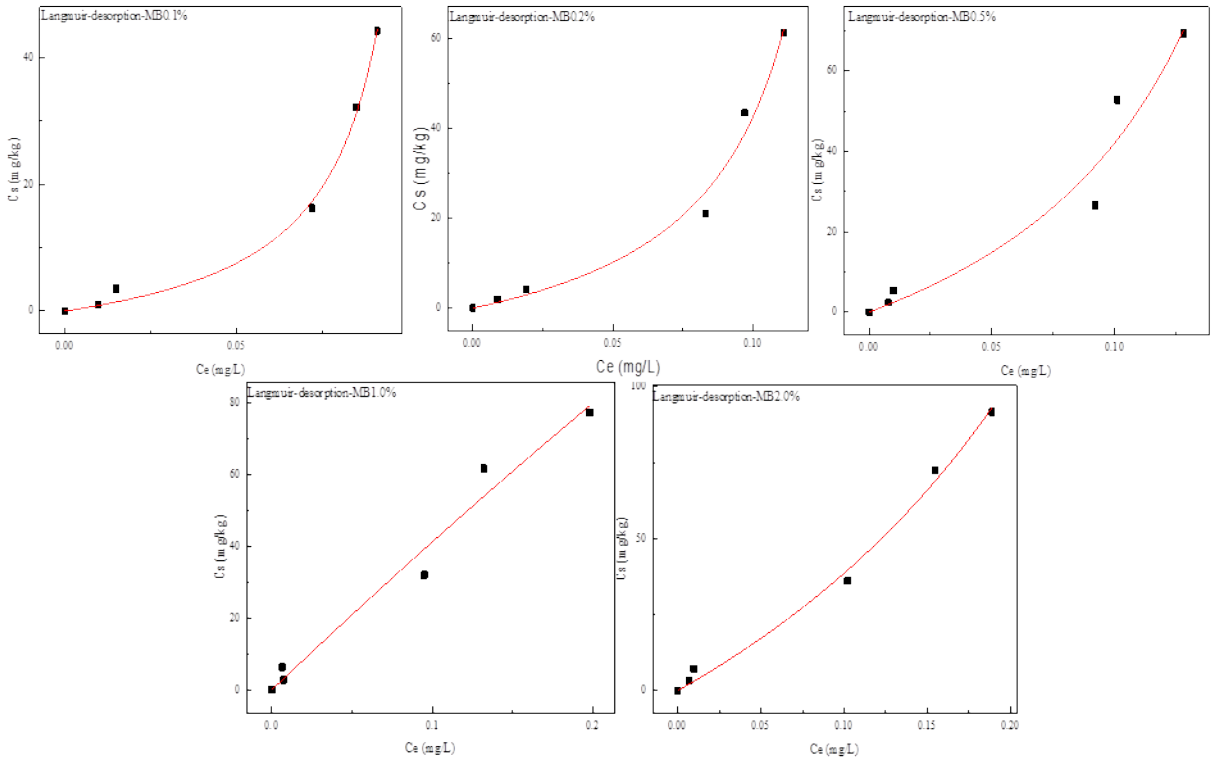

Fig.S13 Langmuir desorption isotherm fitting curve of MB Biochar soil

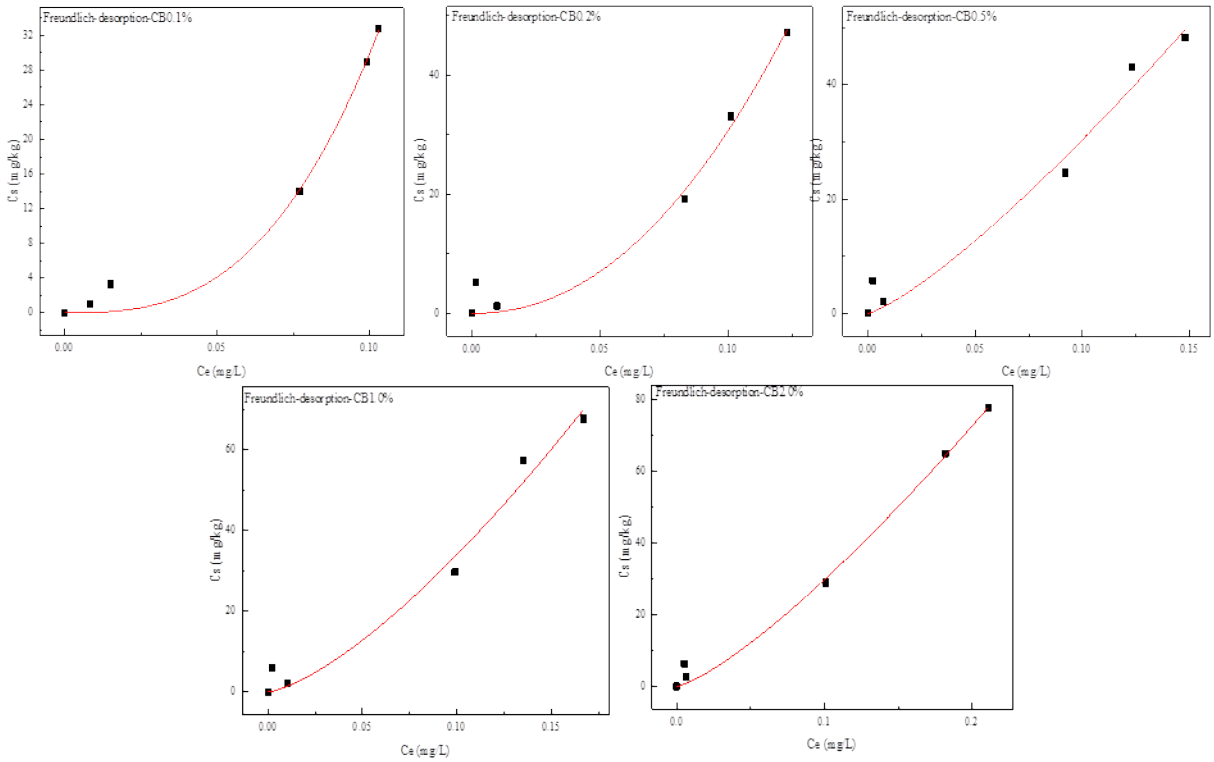

Fig.S14 Freundlich desorption isotherm fitting curve of CB Biochar soil

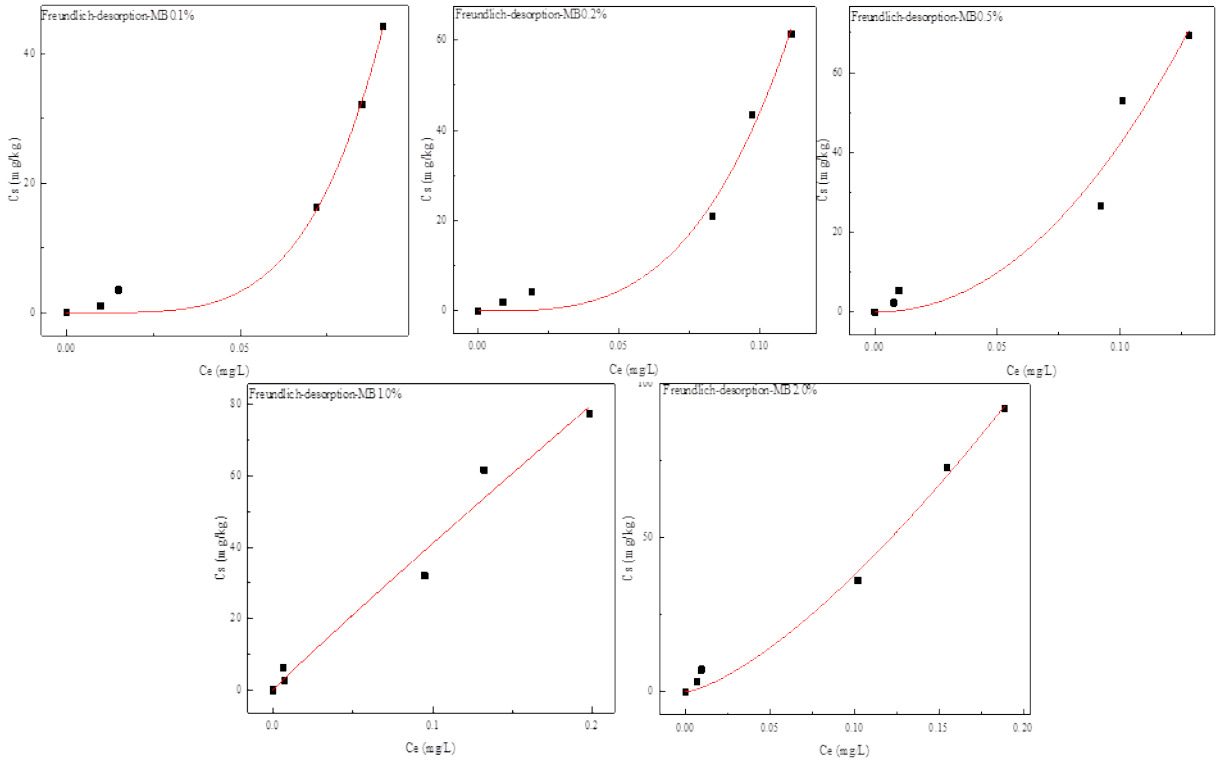

Fig.S15 Freundlich desorption isotherm fitting curve of MB Biochar soil

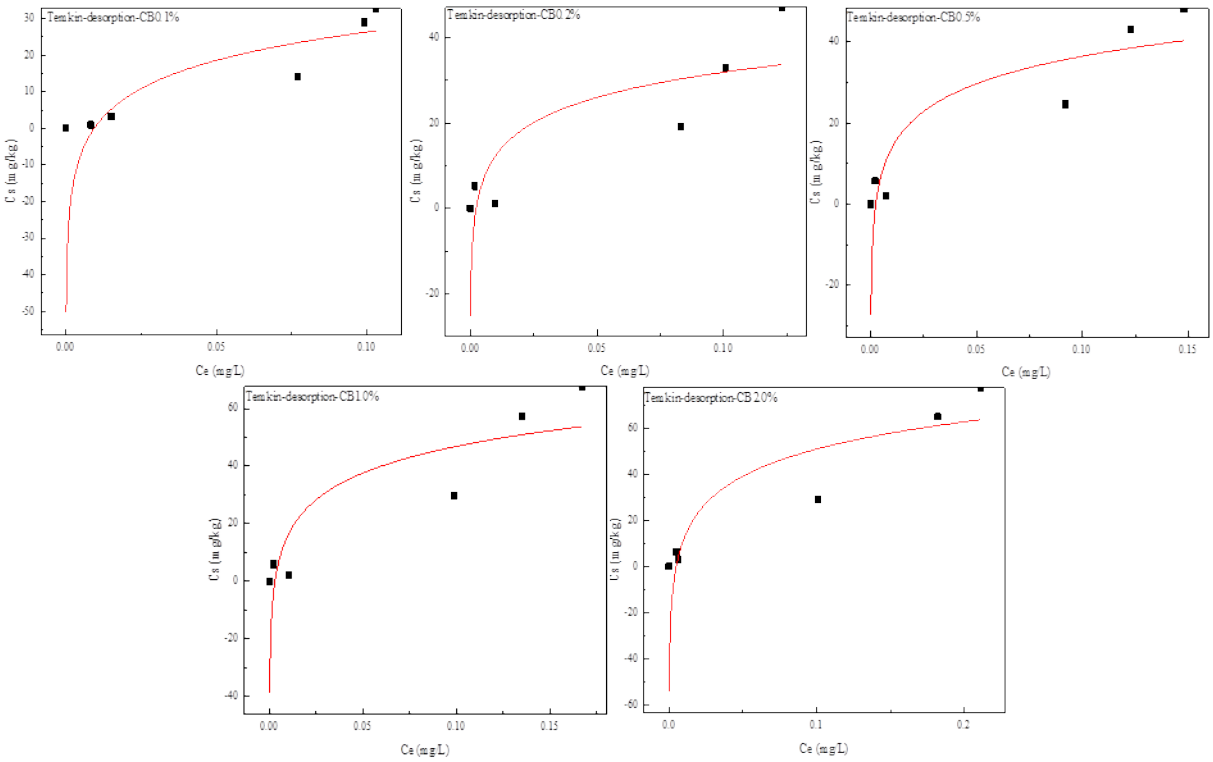

Fig.S16 Temkin desorption isotherm fitting curve of CB Biochar soil

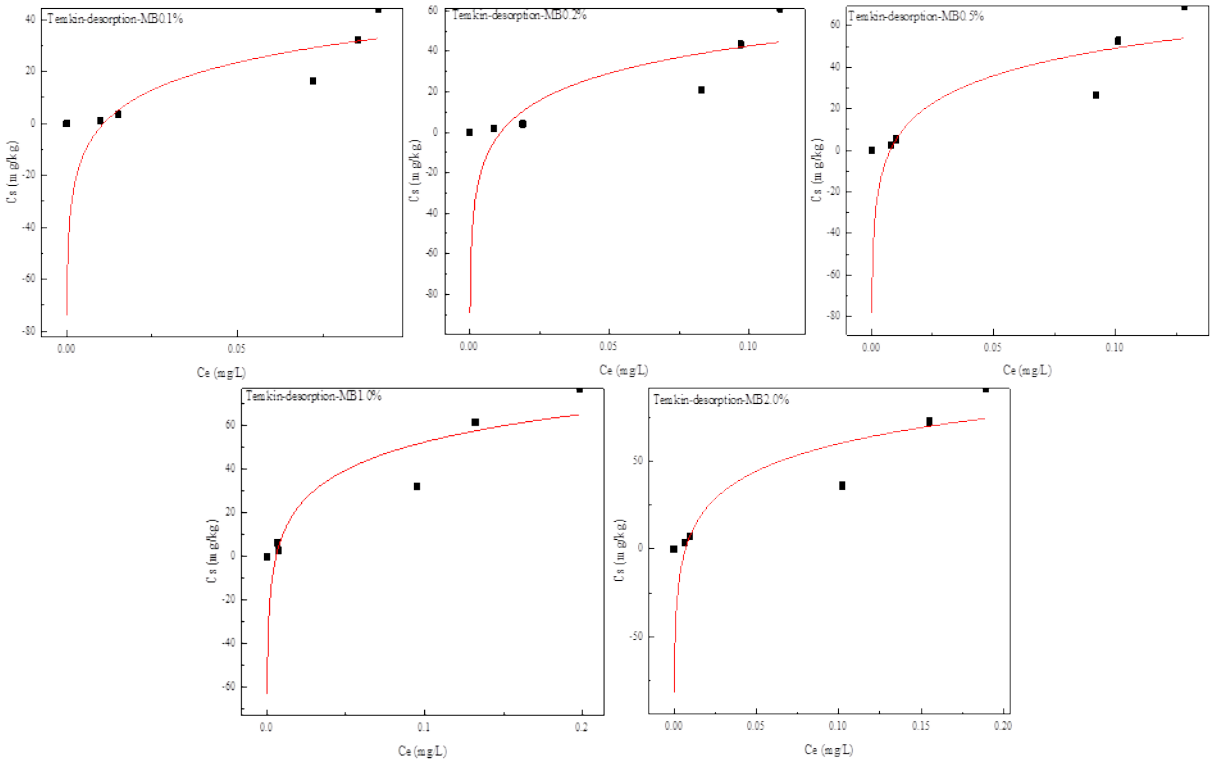

Fig.S17 Temkin desorption isotherm fitting curve of MB Biochar soil