water

Supplementary Materials

1. Figure S1 shows the calibration curves of MB at pH 5.

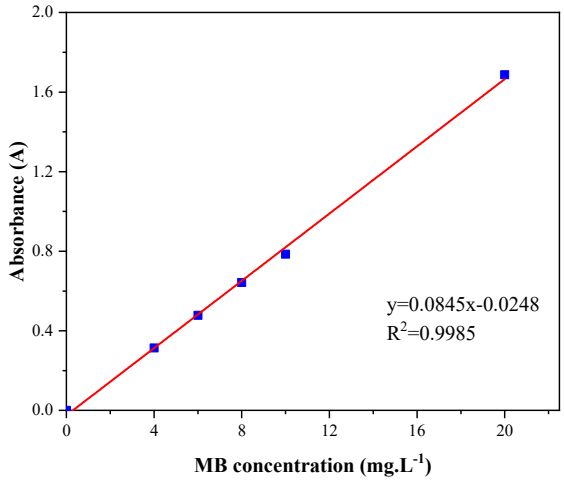


Figure 1. MB standard curve.

2. The analysis of intra-particle diffusion model

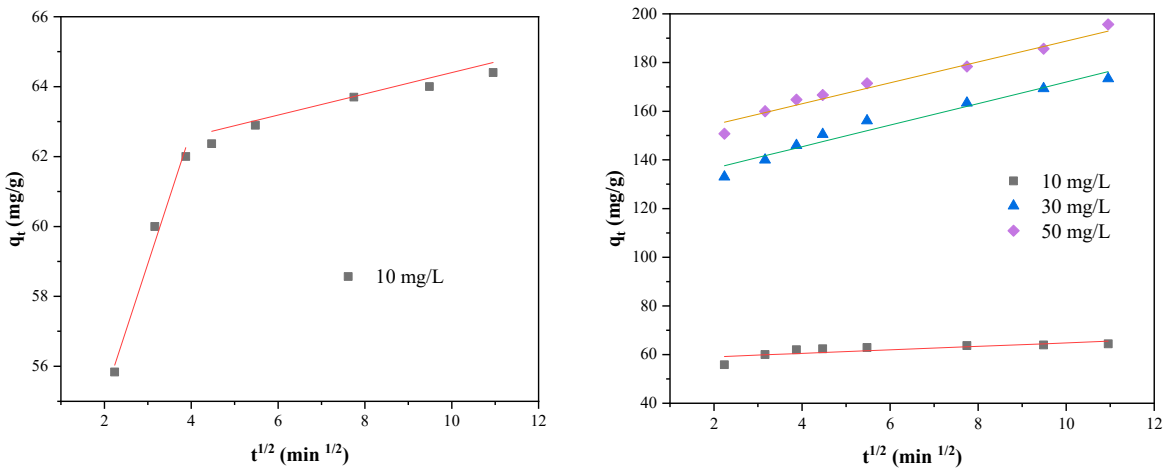
The possibility of intra-particle diffusion was explored by using the intra-particle diffusion model. The intra-particle diffusion model was expressed as the following equation:

$$Q_t = k_{ip} t^{\frac{1}{2}} + C_i$$

Where k_{ip} (mg·g^{-1}·min$^{-1/2}$) is the rate constant of the intra-particle diffusion model, and C_i is the constants related to boundary layer thickness expressed in mg·g^{-1}, i.e., the larger the value of C_i, the greater is the boundary layer effect.

Figure S1a shows a multiple line diagram of the intra-particle diffusion process of MB at a concentration of 10 mg·L^{-1} adsorption on SLS-C, and indicates that two adsorption steps were occurred. The first stage represents the film diffusion phase, which is the migration of solute molecules from aqueous solution to the surface of the SLS-C. The second stage is the intra-particle diffusion stage, which is the diffusion of MB molecules from the external surface to the internal microporous structure of the SLS-C. Through curve fitting, the difference of slope (k_{ip}) between the film diffusion stage and intra-particle diffusion stage was shown, indicating that the intra-particle diffusion stage was a slow process, which is consistent with the parameters of the intra-particle diffusion model shown in Table 2 [33].

As shown in Figure S1b, the slope (k_{ip}) of the film diffusion stage was not significantly different from the intra-particle diffusion stage. The R^2 values were close to 1, indicating the application of this model. This revealed the presence of the intra-particle diffusion process [50].



(a) (b)

Figure 2. The intra-particle diffusion model plots for the adsorption of MB on SLS-C (a) at MB concentration of 10 mg·L^{-1}, and (b) at MB concentrations of 10, 30, and 50 mg·L^{-1}.

3. The water quality parameters of different water samples

The tap water sample was collected from laboratory faucets, the raw water sample was collected from the back of the Pearl River, and the waste water sample was collected from a nameless river in the campus. The water samples were used in experiments after filtering through a filter paper to remove impurities.

Table 1. The water quality parameters of different water samples.

Water Sample	Definition	Water Quality Parameters
Tap water	The water supplied to a tap (valve)	pH = 7.00 C_{Ca+}(mg·L^{-1}) = 11.9 C_{Mg2+}(mg·L^{-1}) = 1.7 C_{Na+}(mg·L^{-1}) = 20.3 C_{K+}(mg·L^{-1}) = 1.9
Raw water	The water from river	pH = 6.24 C_{Ca+}(mg·L^{-1}) = 55.6 C_{Mg2+}(mg·L^{-1}) = 16.9 C_{Na+}(mg·L^{-1}) = 198.7 C_{K+}(mg·L^{-1}) = 19.0
Waste water	The water from the stagnant river on the campus	pH = 7.65 C_{Ca+}(mg·L^{-1}) = 12.2 C_{Mg2+}(mg·L^{-1}) = 3.6 C_{Na+}(mg·L^{-1}) = 45.7 C_{K+}(mg·L^{-1}) = 4.1