Supporting information

1 Experimentaldetails

1.1 Effect of solution pH on the solubility of AF

The effect of solution pH on the solubility of AF was investigated at 297.0K ± 0.2K. The initial concentration of AF (C_0) was 100 mg·L^{-1}. HCl (1.0 mol·L^{-1}) and NaOH (0.5 mol·L^{-1}) were used to adjust solution pH.

1.2 AdsorptionofAF onto activated carbon in different pHs

The adsorption of AF onto activated carbon was studiedby mixing 20.0 mg of activated carbon with 30 mL of AF solution (100 .00mg·L^{-1}) in a 50 mL glass at pHs 2.0–11.0, respectively. HCl (1.0 mol·L^{-1}) and NaOH (0.5 mol·L^{-1}) were used to adjust solution pH. After adsorption reached its equilibrium, the adsorbent was immediately separated using centrifuge. Supernate was collected for the determination of residual concentration ofAF. The activated carbon (YEC-8) used herein was purchased from Yihuan Carbon Element Company Ltd (Fuzhou, China). Main characteristics of activated carbon are summarized in Table S1.

Table S1 Main characteristics of activated carbon

parameters	value
surface area /(m^2·g^{-1})	2100
ash /%	0.4
moisture /%	<6
iorn salt /%	0.005
particle size /μm	10

2 Results and discussion

2.1 Effect of solution pH on the solubility of AF

The solubility of fuchsine acid (100.00 mg·L^{-1}) in water at different pHs was investigated. The data (supporting, Fig.S1) showed that the effect of solution pH on the solubility of fuchsine acid was can be negligible because the absorbency (A) and FA retained in the aqueous solution ($C_{e,AF}$) were almost unchanged at pHs 2.0–11.3.

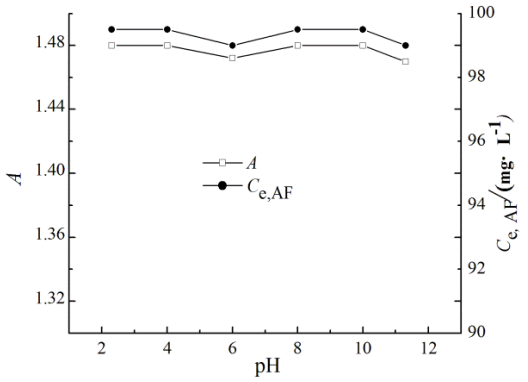

Fig. S1 Effect of solution pH on the solubility of AF at 297.0K ± 0.2K (C_0, 100.00 mg·L^{-1})

2.2 Effect of solution pH on the adsorption of AF onto activated carbon

As shown in Fig. S2, lower solution pH favors for the adsorption of AF on to activate carbon. When the solution pH was higher than 4.0 (especially up to 5.0), the equilibrium adsorption amount (q_e) of AF onto activate carbon obviously decreased. The equilibrium adsorption amount at pH 2.1 and 4.0 were 134.6 and 130.9 mg·g^{-1}, respectively.

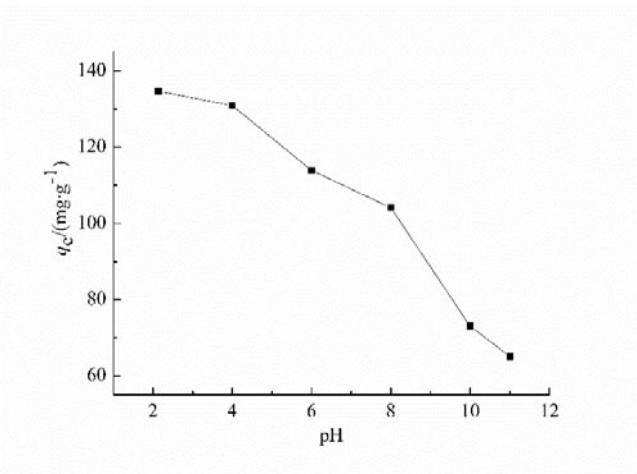

Fig. S2 Effect of pH on the AF adsorption (activated carbon dose, 670.00 mg·L^{-1}; T, 297.0K; agitation rate, 300r·min^{-1}; C_0, 100.00 mg·L^{-1})