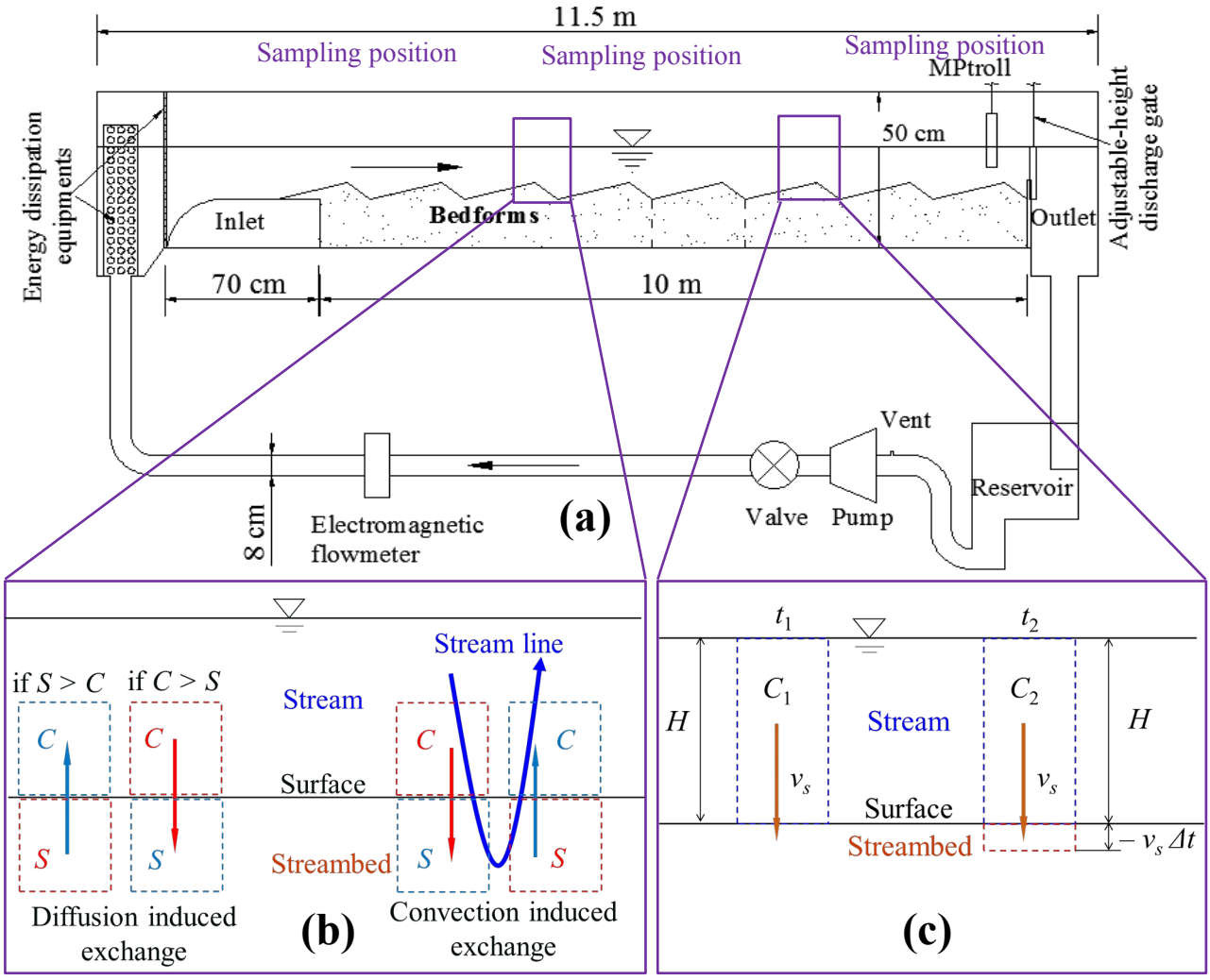


Fig. 1(a) The recirculating flume used in experiment, where water flows with colloidal particles into the sand bed. (b) A schematic diagram of the exchange of colloidal particles by convection and diffusion. (c) A schematic diagram of the settling of colloidal particles into the sand bed.

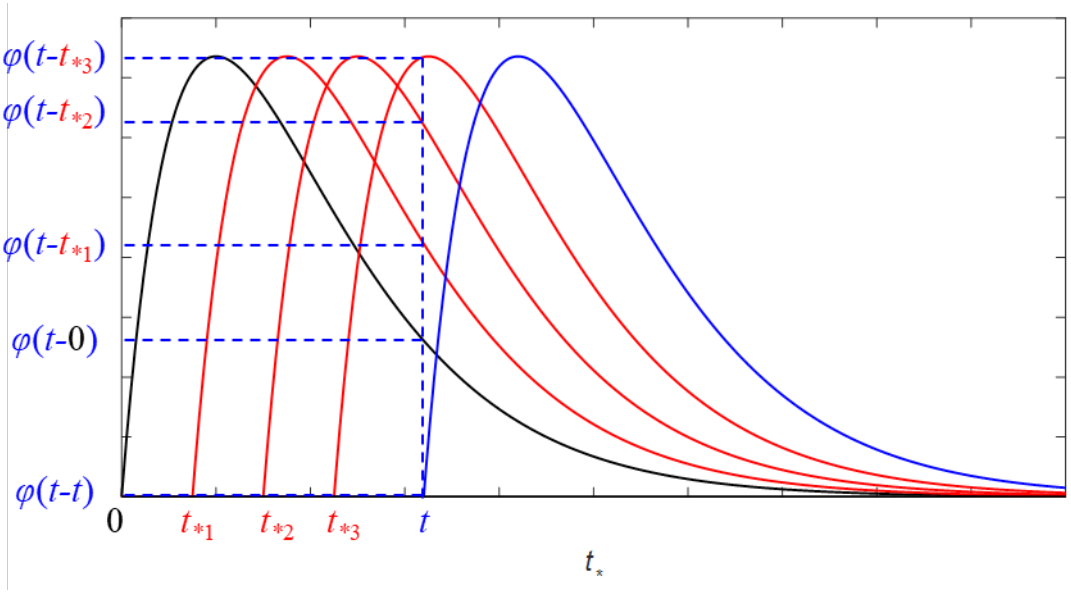

φ(t-t*3)
φ(t-t*2)
φ(t-t*1)
φ(t-0)
φ(t-t)
0
t*1
t*2
t*3
t
t*

Fig. 2 The diagram for the derivation of the release term.

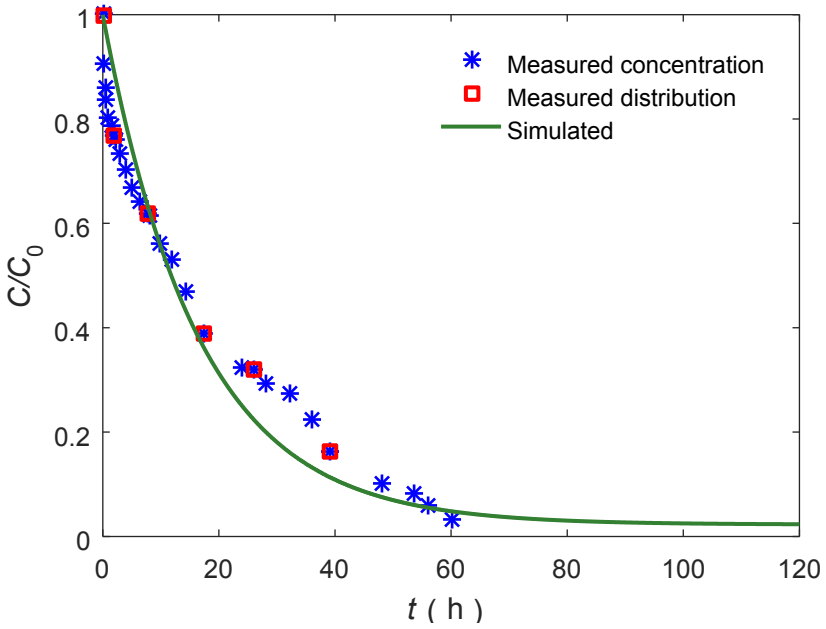


Fig. 3 The variation of measured and simulated concentration of colloids in the overlying water.

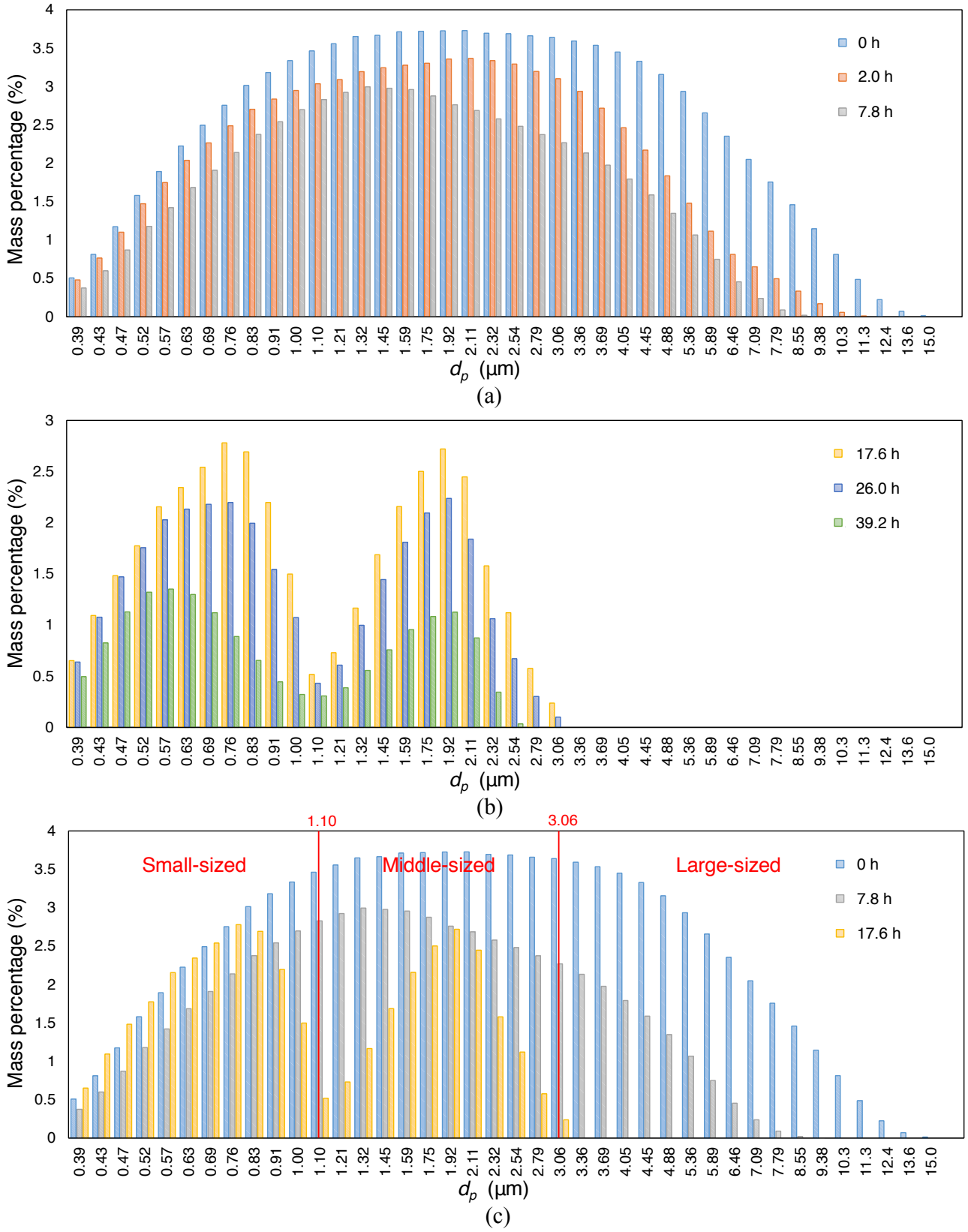
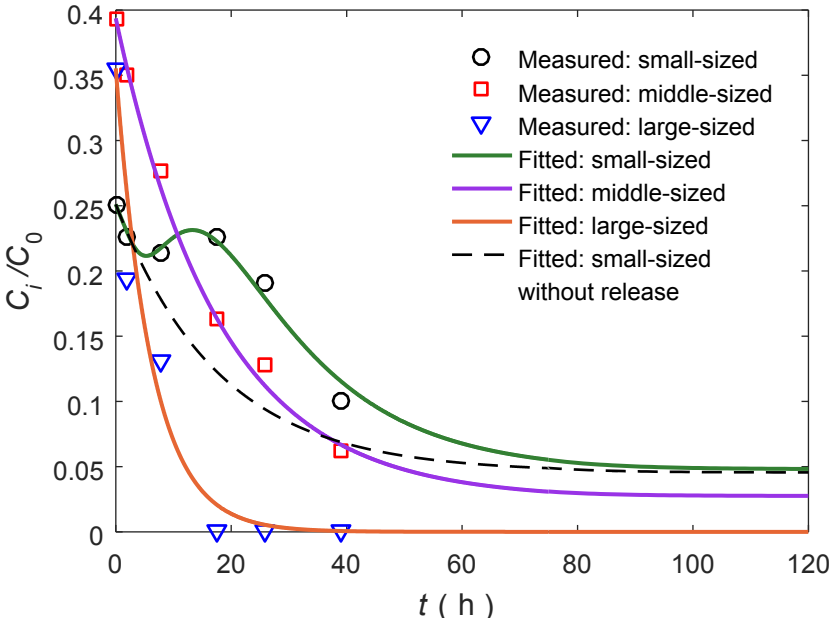
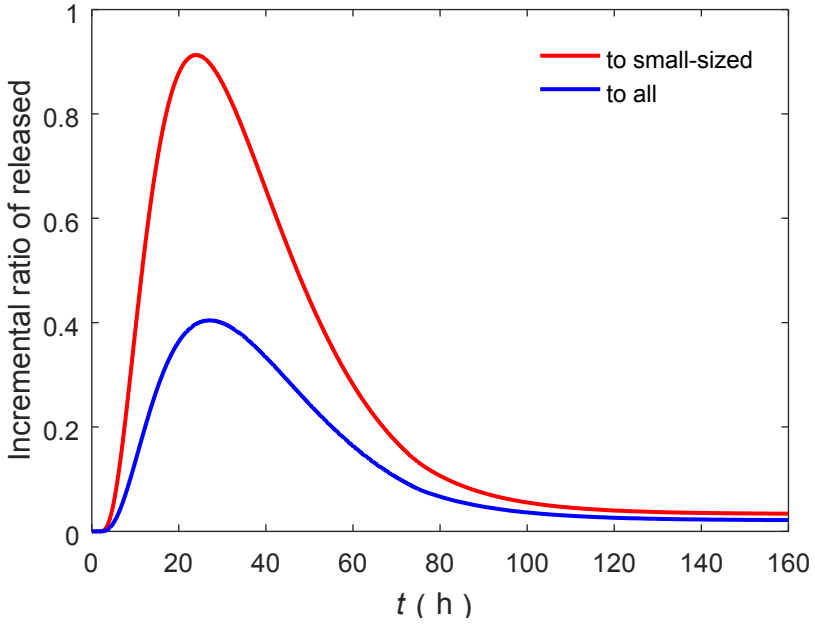


Fig. 4(a) The particle size distribution of colloids in the overlying water at different times. The mass percentage is multiplied by C/C_0 for each time. (a) Sampling time: 0, 2.0 and 7.8 h. (b) Sampling time: 17.6, 26.0 and 39.2 h. (c) Dividing method for small-, middle-, and large-sized colloids.



(a)



(b)

Fig. 5 (a) The variation of concentrations of small-, middle- and large-sized colloids in the overlying water. C_1, C_2 and C_3 are the concentrations of small-, middle- and large-sized colloids, respectively, and C_0 is the total initial concentration of colloids (i = 1, 2, 3). (b) The incremental ratio of released mass to small-sized and all colloids in the overlying water.

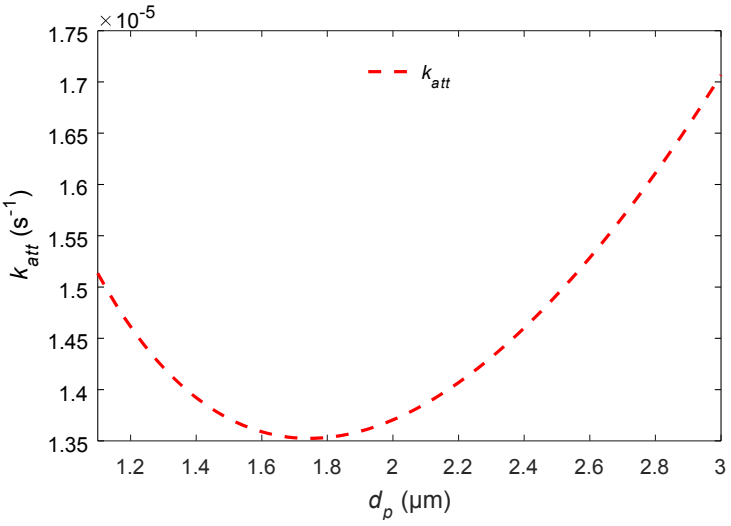
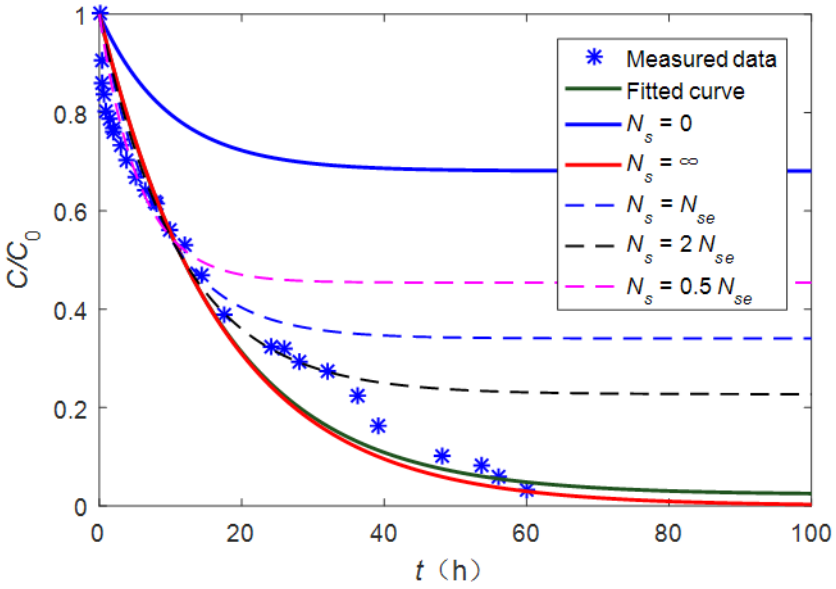
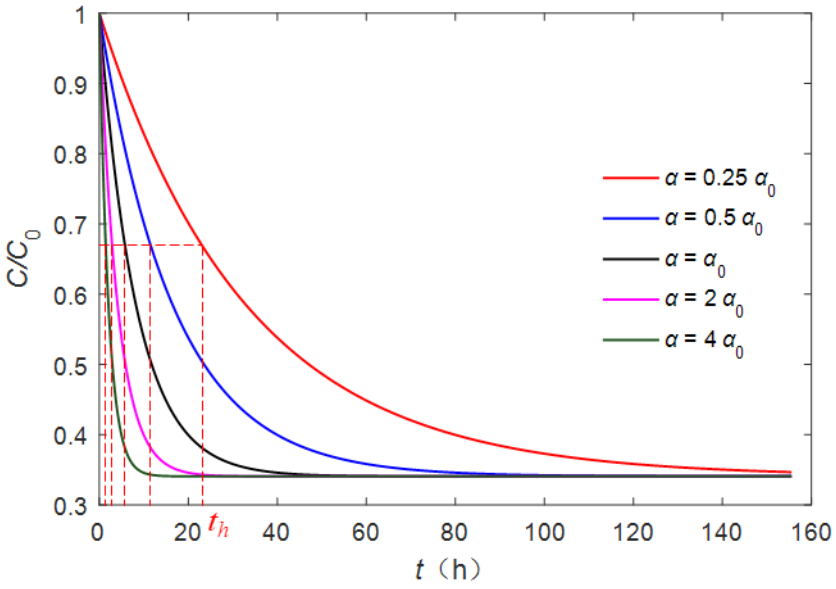


Fig. 6 Relationship between attachment coefficient and particle size.

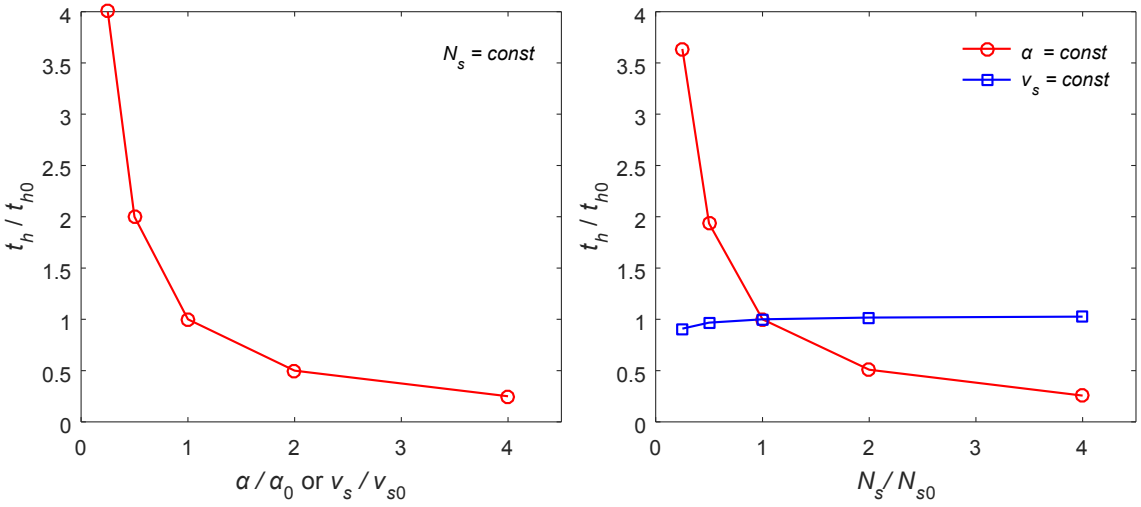


(a)



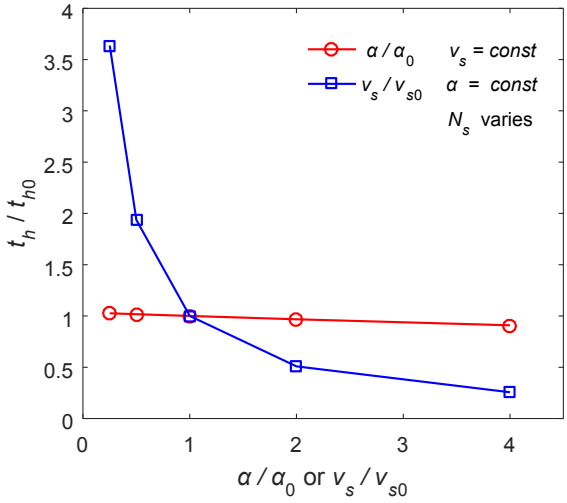
(b)

Fig. 7 (a) The measured data, fitted curve and curves for different N_s values. (b) Comparison of the concentrations of colloids with different mass transfer coefficients (α) and the same N_s ($N_s = N_{se}$) in the overlying water.



(a)

(b)



(c)

Fig. 8 (a) The sensitivity curves of parameters α and v_s to t_h (N_s is a constant; α and v_s vary in Eq. 14 and Eq. 15). (b) The sensitivity curves of parameters N_s to t_h (α and v_s are constants; N_s varies in Eq. 14 and Eq. 15). (c) The red line represents the sensitivity curve of parameter α to t_h (v_s is a constant; N_s varies in Eq. 10). The blue line represents the sensitivity curve of parameter v_s to t_h (α is a constant; N_s varies in Eq. 10). v_{s0}, α_0, t_{h0} and N_{s0} represent parameters in the authentic case.