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Second order rate coefficients for Congo Red adsorption on a few adsorbents

Elovich coefficient for adsorption of Congo red (100 mg L$^{-1}$) on clays (kaolinites 2 g L$^{-1}$, montmorillonites 0.4 g L$^{-1}$; initial dye concentration 100 mg L$^{-1}$; pH 6.4; temperature 303 K).

Intraparticle diffusion coefficient for adsorption of Congo red on clays (kaolinites 2 g L$^{-1}$, montmorillonites 0.4 g L$^{-1}$; initial dye concentration 100 mg L$^{-1}$; pH 6.4; temperature 303 K).

Liquid film diffusion coefficient for adsorption of Congo red (100 mg L$^{-1}$) on clays (kaolinites 2 g L$^{-1}$, montmorillonites 0.4 g L$^{-1}$; initial dye concentration 100 mg L$^{-1}$; pH 6.4; temperature 303 K).

Values of first order and second order rate coefficients for adsorption of Rhodamine B on clays (kaolinites 2 g L$^{-1}$, montmorillonites 0.4 g L$^{-1}$; initial dye concentration 100 mg L$^{-1}$; pH 6.9; temperature 303 K).

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Second order rate coefficients for Rhodamine B adsorption on some adsorbents

Elovich coefficient for adsorption of Rhodamine B on clays (kaolinites 2 g L$^{-1}$, montmorillonites 0.4 g L$^{-1}$; initial dye concentration 100 mg L$^{-1}$; pH 6.9; temperature 303 K).

Intraparticle diffusion coefficient for adsorption of Rhodamine B on clays (kaolinites 2 g L$^{-1}$, montmorillonites 0.4 g L$^{-1}$; initial dye concentration 100 mg L$^{-1}$; pH 6.9; temperature 303 K).

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First order and second order rate coefficients for adsorption of Brilliant Green on clays (kaolinites 2 g L$^{-1}$, montmorillonites 1.0 g L$^{-1}$; initial dye concentration 50 mg L$^{-1}$ for kaolinites and 100 mg L$^{-1}$ for montmorillonites; pH 5.4; temperature 303 K, $k_1$ in min$^{-1}$ and $k_2$ in g mg$^{-1}$min$^{-1}$)

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4.23 Intraparticle diffusion coefficient for adsorption of Brilliant Green on clays (kaolinites 2.0 g L⁻¹, montmorillonites 1.0 g L⁻¹, initial dye concentration 50 mg L⁻¹ for kaolinites and 100 mg L⁻¹ for montmorillonites, pH 5.4, temperature 303 K).

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Elovich, Intra-particle diffusion and liquid film diffusion rate coefficient for adsorption of Procion red MX5B on clays (kaolinites $2 \text{ g L}^{-1}$, montmorillonites $1.0 \text{ g L}^{-1}$; initial dye concentration $50 \text{ mg L}^{-1}$; pH 6.3; temperature 303 K)

Freundlich, Langmuir and Temkin isotherm parameters for adsorption of Methylene blue from aqueous solution (pH 7.5) on clay minerals at 303 K. [Methylene blue 50 – 350 mg L$^{-1}$ for kaolinite $K$, $K_1$, $K_2$ (2.0 g L$^{-1}$) and 80 – 400 mg L$^{-1}$ for montmorillonite $Mt$, $Mt_1$, $Mt_2$ (0.4 g L$^{-1}$)] $K_f$ in mg$^{1/n}$L$^{1/n}$g$^{-1}$, $q_m$ and $b$ are in mg g$^{-1}$ and L mg$^{-1}$, $k_T$ in L mg$^{-1}$.

Langmuir adsorption capacities ($q_m$) for Methylene blue adsorption

Isotherm parameters for adsorption of Congo red from aqueous solution (pH 6.4) on clay minerals at 303 K. [Congo red 50 – 350 mg L$^{-1}$ for kaolinite $K$, $K_1$, $K_2$ (2.0 g L$^{-1}$) and 80 – 400 mg L$^{-1}$ for montmorillonite $Mt$, $Mt_1$, $Mt_2$ (0.4 g L$^{-1}$)] $K_f$ in mg$^{1/n}$L$^{1/n}$g$^{-1}$, $q_m$ and $b$ are in mg g$^{-1}$ and L mg$^{-1}$.

Congo red Langmuir adsorption capacity ($q_m$) of some adsorbents

Isotherm parameters for adsorption of Rhodamine B from aqueous solution (pH 6.9) on clay minerals at 303 K. [Rhodamine B 50 – 350 mg L$^{-1}$ for kaolinite $K$, $K_1$, $K_2$ (2.0 g L$^{-1}$) and 80 – 400 mg L$^{-1}$ for montmorillonite $Mt$, $Mt_1$, $Mt_2$ (0.4 g L$^{-1}$)].

Rhodamine B Langmuir adsorption capacity ($q_m$) of some adsorbents

Isotherm parameters for adsorption of Brilliant Green from aqueous solution (pH 5.4) on clay minerals at 303 K. [Brilliant Green 10 – 120 mg L$^{-1}$ for kaolinite $K$, $K_1$, $K_2$ (2.0 g L$^{-1}$) and 70 – 300 mg L$^{-1}$ for montmorillonite $Mt$, $Mt_1$, $Mt_2$ (1.0 g L$^{-1}$)] $K_f$ in mg$^{1/n}$L$^{1/n}$g$^{-1}$, $q_m$ and $b$ are in mg g$^{-1}$ and L mg$^{-1}$.

Brilliant Green Langmuir adsorption capacity ($q_m$) of some adsorbents

Isotherm parameters for adsorption of Crystal violet from aqueous solution (pH 5.9) on clay minerals at 303 K. [Crystal violet 80 – 300 mg L$^{-1}$ for kaolinite $K$, $K_1$, $K_2$ (2.0 g L$^{-1}$) and montmorillonite $Mt$, $Mt_1$, $Mt_2$ (0.4 g L$^{-1}$)] $K_f$ in mg$^{1/n}$L$^{1/n}$g$^{-1}$, $q_m$ and $b$ are in mg g$^{-1}$ and L mg$^{-1}$.

Crystal violet Langmuir adsorption capacity ($q_m$) of some adsorbents

Isotherm parameters for adsorption of Crocein Orange G (20 – 120 mg L$^{-1}$) from aqueous solution (pH 6.3) on clay minerals at 303 K.
[kaolinite K, K1, K2 (2.0 g L\(^{-1}\)) and montmorillonite Mt, Mtl, Mt2 (1.0 g L\(^{-1}\))].

6.12 Isotherm parameters for adsorption of Procion Red MX5B from aqueous solution (pH 6.2) on clay minerals at 303 K. [Procion Red MX5B 20 – 120 mg L\(^{-1}\) for kaolinite K, K1, K2 (2.0 g L\(^{-1}\)) and 20 – 150 mg L\(^{-1}\) for montmorillonite Mt, Mtl, Mt2 (1.0 g L\(^{-1}\))]. \(k_f\) in mg\(^{1/n}\) L\(^{1/n}\) g\(^{-1}\), \(q_m\) and \(b\) are in mg g\(^{-1}\) and L mg\(^{-1}\), \(k_T\) in L mg\(^{-1}\).

7.1 Thermodynamic data (mean for 10 different dye concentrations) for Methylene Blue adsorption on clays (kaolinites 2 g L\(^{-1}\), dye 50-350 mg L\(^{-1}\) and montmorillonites 0.4 g L\(^{-1}\); dye 80-400 mg L\(^{-1}\); pH 7.5).

7.2 Thermodynamic data (mean for 10 different dye concentrations) for Congo Red adsorption on clays (kaolinites 2 g L\(^{-1}\), dye 50-350 mg L\(^{-1}\) and montmorillonites 0.4 g L\(^{-1}\); dye 80-400 mg L\(^{-1}\); pH 6.4).

7.3 Thermodynamic data (mean for 10 different dye concentrations) for Rhodamine B adsorption on clays (kaolinites 2 g L\(^{-1}\), dye 50-350 mg L\(^{-1}\) and montmorillonites 0.4 g L\(^{-1}\); dye 80-400 mg L\(^{-1}\); pH 6.9).

7.4 Thermodynamic data (mean of values for 8 different dye concentrations) for Brilliant Green adsorption on clays (kaolinites 2 g L\(^{-1}\), dye 10-120 mg L\(^{-1}\) and montmorillonites 1.0 g L\(^{-1}\); dye 70-300 mg L\(^{-1}\); pH 5.4).

7.5 Thermodynamic data (mean for 8 different dye concentrations) for Crystal violet (80 – 300 mg L\(^{-1}\)) adsorption on clays (kaolinites 2 g L\(^{-1}\) and montmorillonites 0.4 g L\(^{-1}\); pH 5.9).

7.6 Thermodynamic data (mean for 6 different dye concentrations) for Crocein Orange G (20 – 120 mg L\(^{-1}\)) adsorption on clays (kaolinites 2 g L\(^{-1}\) and montmorillonites 1.0 g L\(^{-1}\); pH 6.3).

7.7 Thermodynamic data (mean of 6 different dye concentrations) for Procion Red MX5B (20 – 120 mg L\(^{-1}\)) adsorption on clays (kaolinites 2 g L\(^{-1}\) and montmorillonites 1.0 g L\(^{-1}\); pH 6.2).

8.1 Variations in surface area, pore volume, pore diameter and CEC of kaolinite (K), 0.25M acid-treated kaolinite (K1), 0.50 M acid-treated kaolinite (K2), montmorillonite (Mt), 0.25 M acid-treated montmorillonite (Mtl) and 0.50 M acid-treated montmorillonite (Mt2).

8.2 Comparison of Langmuir monolayer adsorption capacities of the clay minerals for all the seven dyes at 303 K. (MB: Methylene Blue. RB: Rhodamine B, CV: Crystal violet, BG: Brilliant Green, CR: Congo red, COG: Crocein Orange G and MX5B: Procion Red MX5B)