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LIST OF ABBREVIATIONS

| | |
|------------------|--|
| % removal | percentages of heavy metal removal |
| C_0 | initial concentration (mg/L) |
| C_i | remaining concentration at any time (mg/L) |
| K_L | Langmuir adsorption constant (L/mg) |
| q_e | amount of adsorption equilibrium (mg/g) |
| q_m | monolayer adsorption capacity of the adsorbent (mg/g) |
| C_e | solute concentration at equilibrium (mg/L) |
| C_o | initial concentration of arsenate solution (mg/L) |
| R_L | dimensionless separation factor |
| K_F | Freundlich adsorption constant (L/g) |
| n | Freundlich constants |
| q_d | Dubinin-Radushkevich monolayer capacity (mg/g) |
| β | a constant related to adsorption energy |
| ε | Polanyi potential |
| A_T | Tempkin isotherm constants |
| b | Tempkin isotherm constants |
| A | Harkin's - Jura isotherm constants |
| B | Harkin's - Jura isotherm constants |
| T | absolute temperature |
| q_t | amounts of solute adsorbed at any time (mg/g) |
| t | time (min) |
| k_1 | rate constant of pseudo-first-order adsorption (min^{-1}) |
| k_2 | rate constant of pseudo-second-order adsorption ($\text{g/mg}\cdot\text{min}$) |
| h | initial adsorption rate ($\text{mg/g}\cdot\text{min}$) |
| k_p | intra-particle diffusion rate constant ($\text{mmol/g}\cdot\text{min}^{1/2}$) |
| ΔG° | gibbs free energy change |
| ΔH° | enthalpy change |
| ΔS° | entropy change |

LIST OF ABBREVIATIONS (Cont.)

| | |
|---------------|--|
| β | a constant related to adsorption energy |
| ε | Polanyi potential |
| A | Harkin's - Jura isotherm constants |
| A_T | Tempkin isotherm constants |
| B | Harkin's - Jura isotherm constants |
| b | Tempkin isotherm constants |
| b_i | linear coefficients |
| b_0 | intercept coefficient |
| b_{ii} | quadratic coefficients |
| b_{ij} | interaction term |
| C_e | equilibrium concentrations solution (mg/L) |
| C_o | initial solution concentrations (mg/L) |
| C_t | concentration solution at time (mg/L) |
| E | mean adsorption energy (kJ/mol) |
| k_1 | rate constant of pseudo-first-order adsorption (min^{-1}) |
| k_2 | the rate constant of pseudo-second-order adsorption (g/mg·min) |
| k_D | Dubinin-Radushkevich constant |
| k_F | Freundlich adsorption constant (L/g) |
| k_L | Langmuir adsorption constant (L/mg) |
| k_{i1} | intra-particle diffusion rate constant at slope 1 ($\text{mmol/g} \cdot \text{min}^{1/2}$) |
| k_{i2} | intra-particle diffusion rate constant at slope 2 ($\text{mmol/g} \cdot \text{min}^{1/2}$) |
| M | is mass of adsorbent (g) |
| n | Freundlich constants |
| q_e | adsorption capacity at equilibrium (mg/g) |
| $q_{e,exp}$ | adsorption capacity at equilibrium for experimental(mg/g) |
| $q_{e,cal}$ | adsorption capacity at equilibrium for calculated (mg/g) |

LIST OF ABBREVIATIONS (Cont.)

| | |
|-------------|---|
| q_D | adsorption capacity at equilibrium for Dubinin-Radushkevich isotherm (mg/g) |
| R_L | dimensionless separation factor of Langmuir adsorption |
| q_{max} | adsorption capacity at equilibrium for Langmuir isotherm (mg/g) |
| q_t | adsorption capacity at time (mg/g) |
| R^2 | determination coefficients |
| R^2_{adj} | adjusted determination coefficients |
| R^2_{pre} | predicted determination coefficients |
| SD | standard deviation |
| t | time (min) |
| V | volume of the solution (L) |
| Y | response denoted as the predicted As^{5+}/As^{3+} percentage adsorption |
| X_1 | adsorbent dose (g/L) |
| X_2 | pH |
| X_3 | initial concentration ($\mu\text{g/L}$) |