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LIST OF ABERVIATIONS

AAS	Atomic Absorption Spectrophotometer
AgNO₃	Silver nitrate
As (III)	Arsenite/Arsenic (III)
As (V)	Arsenate/Arsenic (V)
BaCl₂	Barium chloride
Bi(OH)₃	Bismuth hydroxide
Bi₂O₃	Bismuth trioxide
BiOOH	Bismuthyl hydroxide
BIS	Bureau of Indian Standard
CER	Chloride exchange ratio
EC	European commission
EDS	Energy dispersive X-ray spectroscopy
FT-IR	Fourier Transform Infra-red spectroscopy
GV	Guidelines value
HBO₁	Hydrous Bismuth Oxide 1(1:1 v/v)
HBO₂	Hydrous Bismuth Oxide 2 (1:2 v/v)
HBO₃	Hydrous Bismuth Oxide 3 (1:3 v/v)
HBO_{12mix}	HBO ₁ +HBO ₂
HBO_{13mix}	HBO ₁ +HBO ₃
HCl	Hydrochloric acid
HCO₃⁻	Bicarbonate (alkalinity)
HMO	Hydrous metal oxide
JCPDS	International Centre for Diffraction Data 12 Campus Boulevard, Newtown Square, PA 19073-3273 U.S.A.

KCrO₄	Potassium chromate
MCL	Maximum contamination level
ML	Mandatory limit
Na₂HAsO₄.7H₂O	Sodium arsenate dibasic heptahydrate
Na₂SO₄	Sodium sulfate
NaBH₄	Sodium borohydride
NaCl	Sodium chloride
NaF	Sodium fluoride
NaHCO₃	Sodium bicarbonate
NaNO₃	Sodium nitrate
NaOH	Sodium hydroxide
NH₂.SO₃H	Sulphamic acid
NO₃⁻	Nitrate
PL	Permissible limit
rpm	Revolution per minute
SEM	Scanning Electron Microscope
SO₄²⁻	Sulphate/ Sulfate
TISAB	Total Ionic Strength Adjustment Buffer
USEPA	United States Environmental Protection Agency
WHO	World health organization
XRD	X-ray diffraction

LIST OF SYMBOLS

$^{\circ}\text{C}$	Degree Celsius
$\mu\text{g/g}$	Microgram/gram
$\mu\text{g/L}$	Microgram/Liter
b	Adsorption equilibrium constant (L/mg)
c	Constant related to the Weber and Morris model
C	Effluent or final concentration (mg/L)
C_e	Concentration at equilibrium (mg/L)
C_o	Influent or initial concentration (mg/L)
C_u	Coefficient of uniformity
D₁₀	Effective particle size in mm
D₆₀	Effective size through which 60% particle will pass in mm
E	Mean free energy of adsorption (kJ/mol)
F⁻	Fluoride
g	Mass in gram
H	Height of column
K	Constant related to adsorption energy
K₁	Pseudo-first-order rate constant (min ⁻¹)
K₂	Pseudo-second-order rate constant (min ⁻¹)
K₃	Weber Morris rate constant (min ^{-1/2})
K_{ba}	Bohart adam rate constant [mL/(min mg)]
K_{th}	Thomas rate constant [mL/(min mg)]
K_{yn}	Yoon Nelson rate constant (1/h);
m	Mass of adsorbent per liter of solution (g/L)
M	Molarity (moles/Liter)

mg/g	Milligram/gram
mg/L	Milligram/Liter
n	Freundlich constant
N	Normality (moles equivalent/Liter)
P	Standard thermodynamic equilibrium constant (L/g)
pH_{pzc}	Point of zero charge
q_a	Theoretical adsorption capacity (mg/g)
q_{ba}	Bohart adam maximum concentration of solute (mg/g)
q_e	Adsorption capacity at equilibrium (mg/g)
q_o	Maximum adsorption capacity (mg/g)
q_t	Adsorption capacity at any time t (mg/g)
q_{th}	Thomas maximum concentration of solute (mg/g)
R	Gas constant (8.314 J/mol K)
t	Service time of column under the above conditions (h)
T	Absolute temperature in Kelvin (K)
v	Linear flow velocity of feed to bed (mL/cm ²)
X	Relative cost of operation
ΔG°	Change in Gibbs free energy
ΔH°	Change in enthalpy
ΔS°	Change in entropy
ε	Polanyi potential
r	Time (t) when C/ C _o = 0.5.
K_f	Isotherm constant related to adsorption capacity