Glossary

A

Adsorption
The mechanism whereby ions or compounds within a liquid or gas adhere to a solid surface upon contact. The term also refers to a method of treating wastes in which activated carbon is used to remove organic compounds from wastewater.

Anion
A negatively charged ion.

Arithmetic mean
The sum of a collection of numbers divided by the number of numbers in the collection, commonly referred to as the "average".

B

Biochar
A carbon-rich, porous solid synthesized by heating biomass, such as wood or manure, in a low-oxygen environment (pyrolysis).

Biomaterials
Materials derived from plants or animals created for use as sorption materials.

C

Cation
A positively charged ion.

Coagulation
The process of destabilizing a colloid or suspension that unbalances the forces that separate the particles, often by neutralizing the charges on the particles and allowing the particles to clump or settle.

E

Electro precipitation/electrocoagulation
The use of an electrical current to enhance the coagulation and precipitation of ionic compounds. The electrical current may attract the compounds to an anode or cathode, or create coagulating ions from a sacrificial anode, or both.

Empty Bed Contact Time (EBCT)
A measure of the time during which water to be treated is in contact with the treatment medium in a contact vessel, assuming that all liquid passes through the vessel at the same velocity. EBCT is equal to the volume of the empty bed divided by the flow rate (Sacramento State University 2019).

F

Flocculation
A process in which the suspended particles of a destabilized colloid or suspension form groups or clumps (known as a "floc"). Coagulation and flocculation work together to separate solids and liquids containing colloids and suspensions.

Fluorotelomer substance
A polyfluoroalkyl substance produced by the telomerization process.

G

Geometric mean

The central tendency or typical value of a set of numbers, derived by multiplying the numbers in a set then finding the nth root of the product, where “n” is the number of values in the set.

H

Head
The part of a molecule that is a charged functional group attached at one end of the carbon chain tail.

I

Incineration
Thermal destruction process typically characterized by oxidation at temperatures in excess of 1,000°C.

Isomers
Chemicals with the same chemical formula, but different molecular structures.

M

Membrane fouling
Loss of production capacity of a membrane due to accumulation of compounds or biogrowth on the membrane.

Micelles
Particles in which long hydrocarbon tails, repelled by the water molecules and attracted to each other, make up the interior, whereas the negatively charged heads coat the surface and interact with the surrounding water molecules and positive ions (Ege 1999).

Mineralization/decomposition/destruction
The breakdown of a chemical compound into its constituent elements and carbon dioxide and water.

Moiety
A specific group of atoms within a molecule that is responsible for characteristic chemical reactions of that molecule (Helmenstine 2019).

O

Organoclays
A naturally occurring clay mineral that is organically modified to incorporate cations and enhance the sorption capability.

P

Perfluorinated chemical
Subset of PFAS. Have carbon chain atoms that are totally fluorinated. Examples are perfluorooctanoate (PFOA) and perfluorooctane sulfonate (PFOS) (Buck et al. 2011).

Perfluoroalkyl substance
Fully fluorinated alkane (carbon chain) molecule. They have a chain (tail) of two or more carbons atoms with a charged functional group (head) attached at one end.

Permeate
The water treated by a membrane filtration technology, which has passed through the membrane, and from which PFAS have been removed. The contaminants not passing the membrane accumulate in the filtrate, which also does not pass through the membrane.

Polyfluorinated chemical
Subset of PFAS. Have at least one carbon chain atom that is not totally fluorinated (Buck et al. 2011).

Polyfluoroalkyl substance
The molecule has a nonfluorine atom (typically hydrogen or oxygen) attached to at least one, but not all, carbon atoms, while at least two or more of the remaining carbon atoms in the carbon chain tail are fully fluorinated.

Polymer

Large molecules formed by combining many identical smaller molecules.

R

Reactivation
A specific, high-temperature process for restoring GAC's adsorptive capacity by thermal removal and oxidation of adsorbed matter.

Redox
Chemical reduction-oxidation processes and conditions that can result in the alteration of a chemical compound.

Regeneration
The act of restoring some or all of the sorption capacity of a sorptive media (such as activated carbon or ion exchange) by removing the adsorbed matter.

S

Sorption
Removal of a compound from solution by solid phase constituents. This term is often used when the mechanism of removal (adsorption, absorption, or precipitation) is unknown. (Thompson and Goyne 2012).

Stabilization
A process to reduce mobility of compounds in the environment through physical or chemical means.

Surfactant
A surface-active agent that lowers the surface tension of a liquid.

T

Tail
The part of a molecule that is a chain of two or more carbon atoms.

Thermal desorption
Thermal treatment process intended to remove the contaminants from a solid medium (such as soil, sediment, carbon) and drive them into the vapor phase.

Z

Zwitterion
An ionic compound containing both positively and negatively charged groups with a net charge of zero.

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