

DEFINITIONS

TOPIC II-SOLID PHASE

Cation exchange - Is the reaction of cations with the negative charge in soil in order to maintain electrical neutrality in the system.

Cation exchange capacity - Is the magnitude of the negative charge in soils. It is usually expressed in milliequivalents per 100 grams of soil or centimoles of positive charge per kilogram.

Coordination number - The number of ligand atoms arranged in definite geometry and directly bonded to a central ion.

Clay mineral - Naturally occurring inorganic crystalline material found in soils and other earthy deposits, the particles being of clay size; that is, <0.002 mm in diameter.

Clay sized fraction - Refers to soil particles that are less than or equal to two microns in diameter.

Fulvic acid fraction - Fraction of soil organic matter that is soluble in both alkali and acid.

Humic substances - a series of relatively high-molecular-weight, yellow to black colored substances formed by secondary synthesis reactions. The term is used as a generic name to describe the colored material or its fractions obtained on the basis of solubility characteristics. These materials are distinctive to the soil (or sediment) environment in that they are dissimilar to the biopolymers of microorganisms and higher plant (including lignin).

Humins - The alkali insoluble fraction of soil organic matter or humus.

Humic acid - The dark-colored organic material that can be extracted from soil by dilute alkali and other reagents and that is insoluble in dilute acid.

Humus - Total of the organic compounds in soil exclusive of undecayed plant and animal tissues, their "partial decomposition" products, and the soil biomass.

Hymatomelanic acid - alcohol-soluble portion of humic acid.

Interlayer - Materials between layers, including cations, hydrated cations, organic molecules, and hydroxide groups or sheets.

Isomorphous substitution - The replacement of one atom by another of similar size in a crystal lattice without disrupting or changing the crystal structure of the mineral.

Kaolinite - An aluminosilicate mineral of the 1:1 crystal lattice group, which consists of one silicon tetrahedral layer and one aluminum oxide-hydroxide octahedral layer, and (ii) The 1:1 group or family of aluminosilicates.

Lattice - A three-dimensional grid of lines connecting the points representing the centers of structural elements (atoms or ions) in a crystal.

Layer or platelet- A combination of sheets in a 1:1 or 2:1 combination.

Litter - Macroorganic matter (e.g., plant residues) that lies on the soil surface.

Light fraction - Undecayed plant and animal tissues and their partial decomposition products that occur within the soil proper and that can be recovered by flotation with a liquid of high density (see Chapter 1).

Mineral - A natural inorganic compound with definite physical, chemical, and crystalline properties.

Montmorillonite - An aluminosilicate clay mineral with a 2:1 expanding crystal structure; that is, with two silicon tetrahedral layers enclosing an aluminum octahedral layer. Considerable expansion may be caused along the C axis by water moving between silica layers of continuous units.

Montmorillonite-saponite group - Clay minerals with 2:1 crystal lattice structure; that is, two silicon tetrahedral layers enclosing an aluminum octahedral layer. It consists of montmorillonite, beidellite, nontronite, saponite, etc.

Nonhumic substances - Compounds belonging to known classes of biochemistry, such as amino acids, carbohydrates, fats, waxes, resins, organic acids, etc. Humus probably contains most, if not all, of the biochemical compounds synthesized by living organisms.

Permanent cation exchange capacity - Is that which does not vary with a change in soil pH.

pH dependent cation exchange capacity - Is that which increases with an increase in soil pH.

Polymerization - Is a union of two or more molecules of the same kind into another compound.

Primary mineral - A mineral that has not been altered chemically since deposition and crystallization from molten lava.

Radius ratio - Diameter of the cation divided by the diameter of the anion.

Secondary mineral - A mineral resulting from the decomposition of a primary mineral or from the reprecipitation of the products of decomposition of a primary mineral.

Sheet of atoms - Flat array of more than one atomic thickness and composed of one or more levels of linked coordination polyhedra. A sheet is thicker than a plane and thinner than a layer. Example: tetrahedral sheet, octahedral sheet.

Soil biomass - Organic matter present as live microbial tissue.

Soil mineral - Any mineral that occurs as part of or in the soil, and (ii) A natural inorganic compound with definite physical, chemical, and crystalline properties (within the limits of isomorphism), that occurs in the soil.

Soil organic matter - Same as humus

Unit cell - repeat unit by which the crystal lattice can be built.