

Basic agricultural chemistry

Introduction to basic chemistry

1 Important terminology

Chemistry is the study of the properties, composition and structure of matter, the changes that occur in matter, and the energy that is released during these changes.

1.1 Matter

This section defines and explains fundamental concepts in chemistry that apply to all matter or materials.

- The smallest part of matter is an atom. Atoms combine to make up elements, whereas elements make up molecules, and molecules make up compounds. These are all pure substances of matter.
- Objects contain an amount of matter called its mass. The weight of an object is measured by the force with which that object (of a certain mass) is attracted towards the centre of the earth. Although mass and weight are often used interchangeably, their meaning is different: mass is a quantity of matter, and weight is a force.
- All matter can be described by a set of characteristics or properties that are unique to it. Intrinsic properties are properties that are common to all samples of the same kind of matter.
 - A particular material can be made up of various constituents (parts).
 - The way that these are arranged constituents is called the composition of the material.
 - The composition of a material shows its structure.
 - We need knowledge of the way in which the constituents are arranged, or the structure of the material, to understand how the material will behave and possibly how to change a particular property.
- Elements are structural units of matter that cannot be broken down using chemical methods.
 - Elements are pure substances made up of atoms.
 - Atoms consist of electrons, neutrons and protons. Examples: carbon (C), oxygen (O), hydrogen (H), chlorine (Cl).
 - They adhere to themselves or other elements by chemical bonding to form molecules.
 - This bonding process will result in the formation of new pure substances.
- Molecules can be broken down chemically into the elements they are composed of. Examples: carbon dioxide (CO_2), water (H_2O).
 - They can take part in chemical reactions with other molecules by interactions between their atoms.
 - Atoms contained in molecules can react chemically to form compounds.
 - A pure compound can be broken down or be decomposed to two or more pure substances only by chemical means.

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DJ Losen



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