

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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Materials Science and Engineering II David M. Batisdas,Y.Q. Chang,2013-03-11 Selected peer reviewed papers from the 2nd International Conference on Materials Science and Engineering ICMSE 2013 March 8 10 2013 Jiujiang China [Diverse Learning Opportunities Through Technology-Based Curriculum Design](#) Williams, Demetrick, Harkness, N. Nsombi,2018-08-30

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Handbook of Nanomaterials for Industrial Applications Chaudhery Mustansar Hussain, 2018-07-19 Handbook of Nanomaterials for Industrial Applications explores the use of novel nanomaterials in the industrial arena The book covers nanomaterials and the techniques that can play vital roles in many industrial procedures such as increasing sensitivity magnifying precision and improving production limits In addition the book stresses that these approaches tend to provide green sustainable solutions for industrial developments Finally the legal economical and toxicity aspects of nanomaterials are covered in detail making this is a comprehensive important resource for anyone wanting to learn more about how nanomaterials are changing the way we create products in modern industry Demonstrates how cutting edge developments in nanomaterials translate into real world innovations in a range of industry sectors Explores how using nanomaterials can help engineers to create innovative consumer products Discusses the legal economical and toxicity issues arising from the industrial applications of nanomaterials

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