

Short Communication on Modern Chemistry

Byeang Hyeon Kim*

Department of Chemistry, Pohang University of Science and Technology, Korea

EDITORIAL

Chemistry is the scientific discipline involved with elements and compounds composed of atoms, molecules and ions: their composition, structure, properties, behavior and the changes they undergo during a reaction with other substances. In the scope of its subject, chemistry occupies an intermediate position between physics and biology. It is sometimes called the central science because it provides a foundation for understanding both basic and applied scientific disciplines at a fundamental level. For example, chemistry explains aspects of plant chemistry (botany), the formation of igneous rocks (geology), how atmospheric ozone is formed and how environmental pollutants are degraded (ecology), the properties of the soil on the moon (cosmochemistry), how medications work (pharmacology), and how to collect DNA evidence at a crime scene (forensics).

Modern chemistry addresses topics such as how atoms and molecules interact via chemical bonds to form new chemical compounds. There are four types of chemical bonds: covalent bonds, in which compounds share one or more electron(s); ionic bonds, in which a compound donates one or more electrons to another compound to produce ions (cations and anions); hydrogen bonds; and Van der Waals force bonds.

The current model of atomic structure is the quantum mechanical model. Traditional chemistry starts with the study of elementary particles, atoms, molecules, substances, metals, crystals and other aggregates of matter. Matter can be studied in solid, liquid, gas and plasma states, in isolation or in combination. The interactions, reactions and transformations that are studied in chemistry are usually the result of interactions between atoms, leading to rearrangements of the chemical bonds which hold atoms together. Such behaviors are studied in a chemistry laboratory [1].

The chemistry laboratory stereotypically uses various forms of laboratory glassware. However glassware is not central to chemistry and a great deal of experimental (as well as applied/industrial) chemistry is done without it. Solutions of substances in reagent bottles, including ammonium hydroxide and nitric acid, illuminated in different colors.

A chemical reaction is a transformation of some substances into one or more different substances. The basis of such a chemical transformation is the rearrangement of electrons in the chemical

bonds between atoms. It can be symbolically depicted through a chemical equation, which usually involves atoms as subjects. The number of atoms on the left and the right in the equation for a chemical transformation is equal [2]. (When the number of atoms on either side is unequal, the transformation is referred to as a nuclear reaction or radioactive decay.) The type of chemical reactions a substance may undergo and the energy changes that may accompany it are constrained by certain basic rules, known as chemical laws.

Energy and entropy considerations are invariably important in almost all chemical studies. Chemical substances are classified in terms of their structure, phase, as well as their chemical compositions. They can be analyzed using the tools of chemical analysis, e.g. spectroscopy and chromatography. Scientists engaged in chemical research are known as chemists. Most chemists specialize in one or more sub-disciplines. Several concepts are essential for the study of chemistry.

The history of chemistry spans a period from very old times to the present. Since several millennia BC, civilizations were using technologies that would eventually form the basis of the various branches of chemistry. Examples include extracting metals from ores, making pottery and glazes, fermenting beer and wine, extracting chemicals from plants for medicine and perfume, rendering fat into soap, making glass, and making alloys like bronze. Chemistry was preceded by its protoscience, alchemy, which is an intuitive but non-scientific approach to understanding the constituents of matter and their interactions. It was unsuccessful in explaining the nature of matter and its transformations, but, by performing experiments and recording the results, alchemists set the stage for modern chemistry. Chemistry as a body of knowledge distinct from alchemy began to emerge when a clear differentiation was made between them by Robert Boyle in his work. While both alchemy and chemistry are concerned with matter and its transformations, the crucial difference was given by the scientific method that chemists employed in their work. Chemistry is considered to have become an established science with the work of Antoine Lavoisier, who developed a law of conservation of mass that demanded careful measurement and quantitative observations of chemical phenomena. The history of chemistry is intertwined with the history of thermodynamics, especially through the work of Willard Gibbs.

Correspondence to: Byeang Hyeon Kim, Department of Chemistry, Pohang University of Science and Technology, Korea, Tel: +82-54-279-2115. E-mail: bhkim@postech.ac.kr

Received: September 15, 2020; **Accepted:** September 24, 2020; **Published:** October 01, 2020

Citation: Kim HB (2020) Short Communication on Modern Chemistry. Mod Chem Appl. 8:e281. doi:10.35248/2329-6798.20.8.e281.

Copyright: © 2020 Kim HB. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

REFERENCES

1. Warren J. War and the cultural heritage of Iraq: A sadly mismanaged affair. *Third World Quarterly*. 2005;26:815-830.
2. Brown TL, Lemay EH, Bursten BE, Lemay H. *Chemistry: The Central Science* Prentice Hall, USA. 1999;34.