

Chemistry Chapter 4

Balancing chemical Equations

Chemical Reactions

- Reactions involve chemical changes in matter resulting in new substances
- Reactions involve rearrangement and exchange of atoms to produce new molecules
 - Elements are not transmuted during a reaction

Chemical Equations



- CH_4 and O_2 are the reactants, and CO_2 and H_2O are the products
- the (g) after the formulas tells us the state of the chemical
- the number in front of each substance tells us the numbers of those molecules in the reaction
 - called the coefficients

Balancing chemical equations

- Step 1: Determine the state of the reactants and products in the chemical reaction
- Step 2: Write the unbalanced chemical equation
- Step 3: Balance the number of atoms of each element in the reactant and product side, starting with the most complicated molecule

Balancing a Hypothetical Chemical Equation



- In this hypothetical reaction, C and D are the reactants, and X and Y are the products
- The number in front of each substance tells us the numbers of those molecules of reactants and products in the reaction
- So, if you react exactly 3 moles of C with 2 moles of D, then you will produce 5 moles of X and 2 moles of Y.
- If you reacted 6 moles of C with 4 moles of D, you will produce 10 moles of X and 4 moles of Y.

Example: Balancing chemical equations

- Glucose ($\text{C}_6\text{H}_{12}\text{O}_6$) reacts with Oxygen gas to produce gaseous carbon dioxide and water vapor



Reactants

6 C

12 H

8 O

Products

1 C

2 H

3 O

Modern Chemistry Chapter 4 Notes

Terry C. Jones



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The Development of Modern Chemistry Aaron J. Ihde, 1984-01-01 From ancient Greek theory to the explosive discoveries of the 20th century this authoritative history shows how major chemists their discoveries and political economic and social developments transformed chemistry into a modern science 209 illustrations 14 tables Bibliographies Indices Appendices *Nature* Sir Norman Lockyer, 1929

Notes on Democracy Henry Louis Mencken, 2008 Democracy is perhaps the most charming form of government ever devised by man It is based on propositions that are palpably not true and what is not true as everyone knows is always immensely more fascinating and satisfying to the vast majority

Linus Pauling in His Own Words Barbara Marinacci, 1995 Two time Nobel Prize winner Linus Pauling was known for his scientific discoveries and of his breadth of knowledge which spanned disciplines The author who knew Pauling well has chosen from among more than 60 years of essays letters articles books speeches and interviews As Pauling himself says in the Introduction This book will take me as close to writing my memoirs or autobiography as I shall ever get

Modern Language Notes, 1898 Introduction to Modern Inorganic Chemistry Kenneth Malcolm Mackay, Rosemary Ann Mackay, 1981 The electronic structure and the properties of atoms Covalent molecules diatomics Polyatomic covalent molecules The solid state Solution chemistry Experimental methods General properties of the elements in relation to the periodic table Hydrogen The s elements The scandium group and the lanthanides The actinide elements The transition metals general properties and complexes The transition elements of the first series The elements of the second and third transition series Transition metals selected topics The elements of the p block

Modern Alchemy Mark Morrisson, 2007-04-19 Alchemists are generally held to be the quirky forefathers of science blending occultism with metaphysical pursuits Although many were intelligent and well intentioned thinkers the oft cited goals of alchemy paint these antiquated experiments as wizardry not scientific investigation Whether seeking to produce a miraculous panacea or struggling to transmute lead into gold the alchemists radical goals held little relevance to consequent scientific pursuits Thus the temptation is to view the transition from alchemy to modern science as one that discarded fantastic ideas about philosophers stones and magic potions in exchange for modest yet steady results It has been less noted however that the birth of atomic science actually coincided with an efflorescence of occultism and esoteric religion that attached deep significance to questions about the nature of matter and energy Mark Morrisson challenges the widespread dismissal of alchemy as a largely insignificant historical footnote to science by prying into the revival of alchemy and its influence on the emerging subatomic sciences of the late 19th and early 20th centuries Morrisson demonstrates its surprising influence on the emerging subatomic sciences of the late 19th and early 20th centuries Specifically Morrisson examines the resurfacing of occult circles during this time period and how their interest in alchemical tropes had a substantial and traceable impact upon the science of the day Modern Alchemy chronicles several encounters between occult conceptions of alchemy and the new science describing how academic

chemists inspired by the alchemy revival attempted to transmute the elements to make gold Examining scientists publications correspondence talks and laboratory notebooks as well as the writings of occultists alchemical tomes and science fiction stories he argues that during the birth of modern nuclear physics the trajectories of science and occultism so often considered antithetical briefly merged

The First Miracle Drugs John E. Lesch, 2006-10-12 In the decade from 1935 1945 while the Second World War raged in Europe a new class of medicines capable of controlling bacterial infections launched a therapeutic revolution that continues today The new medicines were not penicillin and antibiotics but sulfonamides or sulfa drugs The sulfa drugs preceded penicillin by almost a decade and during World War II they carried the main therapeutic burden in both military and civilian medicine Their success stimulated a rapid expansion of research and production in the international pharmaceutical industry raised expectations of medicine and accelerated the appearance of new and powerful medicines based on research The latter development created new regulatory dilemmas and unanticipated therapeutic problems The sulfa drugs also proved extraordinarily fruitful as starting points for new drugs or classes of drugs both for bacterial infections and for a number of important non infectious diseases This book examines this breakthrough in medicine pharmacy and science in three parts Part I shows that an industrial research setting was crucial to the success of the revolution in therapeutics that emerged from medicinal chemistry Part II shows how national differences shaped the reception of the sulfa drugs in Germany France Britain and the United States The author uses press coverage of the day to explore popular perceptions of the dramatic changes taking place in medicine Part III documents the impact of the sulfa drugs on the American effort in World War II It also shows how researchers came to an understanding of how the sulfa drugs worked adding a new theoretical dimension to the science of pharmacology and at the same time providing a basis for the discovery of new medicinal drugs in the 1940s 1950s and 1960s A concluding chapter summarizes the transforming impact of the sulfa drugs on twentieth century medicine tracing the therapeutic revolution from the initial breakthrough in the 1930s to the current search for effective treatments for AIDS and the new horizons opened up by the human genome project and stem cell research

The Modern Language Journal ,1924 Includes section Reviews **Modern Pyrotechnics** Herbert Ellern,1961 **The Academy and Literature** ,1878 The Academy ,1878 **The Collected Works of William Hazlitt: The principal picture-galleries in England. Notes of a journey through France and Italy. Miscellaneous essays on the fine arts** William Hazlitt,1903 **Resources in Education** ,1997-10 SYNTHESIS OF NATURAL PRODUCTS Kocvosky,1986-09 *Simulation of Liquids and Solids* Giovanni Ciccotti,Daan Frenkel,Ian Ranauld McDonald,1987 *The Collected Works of William Hazlitt* William Hazlitt,1903 **The Bookman** ,1894 *The Modern Researcher* Jacques Barzun, Henry Franklin Graff,1985 **The Nation** ,1875

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