

8.2 The Nature of Covalent Bonding

Connecting to Your World

You know that without oxygen to breathe, you could not live. But did you know that oxygen plays another important role in your life? High in the atmosphere, a different form of oxygen, called ozone, forms a layer that filters out harmful radiation from the sun. The colors in this map indicate the concentrations of ozone in various parts of Earth's atmosphere. In this section, you will learn how oxygen atoms can join in pairs to form the oxygen you breathe and can also join in groups of three oxygen atoms to form ozone.



The Octet Rule in Covalent Bonding

Recall that when ionic compounds form, electrons tend to be transferred so that each ion acquires a noble gas configuration. A similar rule applies for covalent bonds. **In covalent bonds, electron sharing usually occurs so that atoms attain the electron configurations of noble gases.** For example, each hydrogen atom has one electron. But a pair of hydrogen atoms share these two electrons when they form a covalent bond in a hydrogen molecule. Each hydrogen atom thus attains the electron configuration of helium, a noble gas with two electrons. Combinations of atoms of the nonmetals and metalloids in Groups 4A, 5A, 6A, and 7A of the periodic table are likely to form covalent bonds. In this case the atoms usually acquire a total of eight electrons, or an octet, by sharing electrons, so that the octet rule applies.

Single Covalent Bonds

The hydrogen atoms in a hydrogen molecule are held together mainly by the attraction of the shared electrons to the positive nuclei. Two atoms held together by sharing a pair of electrons are joined by a **single covalent bond**. Hydrogen gas consists of diatomic molecules whose atoms share only one pair of electrons, forming a single covalent bond.



Guide for Reading

Key Concepts

- What is the result of electron sharing in covalent bonds?
- How do electron-dot structures represent shared electrons?
- How do atoms form double or triple covalent bonds?
- How are coordinate covalent bonds different from other covalent bonds?
- How is the strength of a covalent bond related to its bond dissociation energy?
- How are oxygen atoms bonded in ozone?
- What are some exceptions to the octet rule?

Vocabulary

single covalent bond
structural formula
unshared pair
double covalent bond
triple covalent bond
coordinate covalent bond
polyatomic ion
bond dissociation energy
resonance structure

Reading Strategy

Identifying Main Idea/Details

List the main idea in the paragraph, following the heading **The Octet Rule in Covalent Bonding**. As you read, list examples of how this rule is followed when a single covalent bond, a double covalent bond, and a triple covalent bond form.

Reading For 8 2 The Nature Of Covalent Bonding

Ian Pickup



Reading For 8 2 The Nature Of Covalent Bonding:

This book delves into Reading For 8 2 The Nature Of Covalent Bonding. Reading For 8 2 The Nature Of Covalent Bonding is an essential topic that must be grasped by everyone, ranging from students and scholars to the general public. This book will furnish comprehensive and in-depth insights into Reading For 8 2 The Nature Of Covalent Bonding, encompassing both the fundamentals and more intricate discussions.

1. This book is structured into several chapters, namely:

- Chapter 1: Introduction to Reading For 8 2 The Nature Of Covalent Bonding
- Chapter 2: Essential Elements of Reading For 8 2 The Nature Of Covalent Bonding
- Chapter 3: Reading For 8 2 The Nature Of Covalent Bonding in Everyday Life
- Chapter 4: Reading For 8 2 The Nature Of Covalent Bonding in Specific Contexts
- Chapter 5: Conclusion

2. In chapter 1, this book will provide an overview of Reading For 8 2 The Nature Of Covalent Bonding. The first chapter will explore what Reading For 8 2 The Nature Of Covalent Bonding is, why Reading For 8 2 The Nature Of Covalent Bonding is vital, and how to effectively learn about Reading For 8 2 The Nature Of Covalent Bonding.
3. In chapter 2, the author will delve into the foundational concepts of Reading For 8 2 The Nature Of Covalent Bonding. The second chapter will elucidate the essential principles that need to be understood to grasp Reading For 8 2 The Nature Of Covalent Bonding in its entirety.
4. In chapter 3, this book will examine the practical applications of Reading For 8 2 The Nature Of Covalent Bonding in daily life. This chapter will showcase real-world examples of how Reading For 8 2 The Nature Of Covalent Bonding can be effectively utilized in everyday scenarios.
5. In chapter 4, the author will scrutinize the relevance of Reading For 8 2 The Nature Of Covalent Bonding in specific contexts. The fourth chapter will explore how Reading For 8 2 The Nature Of Covalent Bonding is applied in specialized fields, such as education, business, and technology.
6. In chapter 5, the author will draw a conclusion about Reading For 8 2 The Nature Of Covalent Bonding. The final chapter will summarize the key points that have been discussed throughout the book.
- This book is crafted in an easy-to-understand language and is complemented by engaging illustrations. This book is highly recommended for anyone seeking to gain a comprehensive understanding of Reading For 8 2 The Nature Of Covalent Bonding.

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Reading For 8 2 The Nature Of Covalent Bonding Introduction

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