

CHAPTER OVERVIEW

5: The Electronic Structure of Atoms

The electronic structures of atoms developed during the first half of the twentieth century. The periodic repetition of chemical properties discovered by Mendeleev led G. N. Lewis to the conclusion that atoms must have a shell structure. This was confirmed by [wave mechanics](#). Only certain specific wave patterns are possible for an electron in an atom, and these electron clouds are arranged in concentric shells.

5.1: Prelude to Electronic Structure

5.1.1: Biology- Applications of Electronic Structure

5.1.2: Lecture Demonstrations

5.2: Electrons and Valence

5.3: Lewis Diagrams

5.3.1: Lewis Diagrams and Biological and Chemical Properties

5.4: The Wave Nature of the Electron

5.4.1: Biology- The Wave Model for Light and Electrons

5.4.2: Lecture Demonstrations

5.4.3: Sports, Physiology, and Health- Sea Kayaking and Clapotis

5.5: Wave Mechanics

5.6: The Uncertainty Principle

5.7: Electron Waves in the Hydrogen Atom

5.8: Orbitals

5.8.1: Cultural Connections- Tones on a Drum and Orbital Wave Functions

5.8.2: Lecture Demonstrations

5.9: Quantum Numbers (Electronic)

5.11: Potential Energy

5.12: Electron Density and Potential Energy

5.13: Atoms Having More Than One Electron

5.14: Hydrogen, Helium, Lithium

5.15: Beryllium, Boron, Carbon

5.16: Electron Configurations

5.17: Electron Configurations and the Periodic Table

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