

5.2 Electron Arrangement in Atoms

Essential Understanding Three rules determine the electron arrangement in an atom: the aufbau principle, the Pauli exclusion principle, and Hund's rule.

After reading Lesson 5.2, answer the following questions.

Electron Configurations

1. The ways in which electrons are arranged into orbitals around the nuclei of atoms are called _____.

Match the name of the rule used to find the electron configurations of atoms with the rule itself.

_____ 2. aufbau principle

_____ 3. Pauli exclusion principle

_____ 4. Hund's rule

a. When electrons occupy orbitals of equal energy, one electron enters each orbital until all the orbitals contain one electron with the same spin direction.

b. Electrons occupy orbitals of lowest energy first.

c. An atomic orbital may describe at most two electrons.

5. Fill in the electron configurations for the elements given in the table.

Use the orbital filling diagrams to complete the table.

Electron Configurations for Some Selected Elements							
Element	Orbital filling						Electron configuration
	1s	2s	2p _x	2p _y	2p _z	3s	
<input type="text"/>	\uparrow	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	1s ¹
He	$\uparrow\downarrow$	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	$\uparrow\downarrow$	\uparrow	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	1s ² 2s ¹
C	$\uparrow\downarrow$	$\uparrow\downarrow$	\uparrow	\uparrow	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	$\uparrow\downarrow$	$\uparrow\downarrow$	\uparrow	\uparrow	\uparrow	<input type="text"/>	1s ² 2s ² 2p ³
O	$\uparrow\downarrow$	$\uparrow\downarrow$	$\uparrow\downarrow$	\uparrow	\uparrow	<input type="text"/>	<input type="text"/>
<input type="text"/>	$\uparrow\downarrow$	$\uparrow\downarrow$	$\uparrow\downarrow$	$\uparrow\downarrow$	\uparrow	<input type="text"/>	1s ² 2s ² 2p ⁵
Ne	$\uparrow\downarrow$	$\uparrow\downarrow$	$\uparrow\downarrow$	$\uparrow\downarrow$	$\uparrow\downarrow$	<input type="text"/>	<input type="text"/>
<input type="text"/>	$\uparrow\downarrow$	$\uparrow\downarrow$	$\uparrow\downarrow$	$\uparrow\downarrow$	$\uparrow\downarrow$	\uparrow	1s ² 2s ² 2p ⁶ 3s ¹

7. In an electron configuration, what does a superscript stand for?

8. In an electron configuration, what does the sum of the superscripts equal?

9. Filled energy sublevels are more _____ than partially filled sublevels.