



Cycle 5 Chemistry 1 Lesson 3

Quantum Subshells & Electron Configuration

Get out Homework for Checking

Warmup: The Periodic Table is made of 4 'blocks' – find them! The 'S-block' is 2 elements wide. The 'P-block' is 6 elements wide. The 'D-block' is 10 elements wide. The 'F-block' is 14 elements wide.

Classwork:

Take notes on shells and subshells

Write Electron Configuration for first 20 elements



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Section 3 Electron Configuration



Blocks of the Periodic Table

1s	1s ¹	
2s	2s ¹	2s ²
3s	3s ¹	3s ²
4s	4s ¹	4s ²
5s	5s ¹	5s ²
6s	6s ¹	6s ²
7s	7s ¹	7s ²

nd^{1-10}

3d									
4d									
5d									
6d									

					1s ²	
2p	2p ¹	2p ²	2p ³	2p ⁴	2p ⁵	2p ⁶
3p	3p ¹	3p ²	3p ³	3p ⁴	3p ⁵	3p ⁶
4p	4p ¹	4p ²	4p ³	4p ⁴	4p ⁵	4p ⁶
5p	5p ¹	5p ²	5p ³	5p ⁴	5p ⁵	5p ⁶
6p	6p ¹	6p ²	6p ³	6p ⁴	6p ⁵	6p ⁶

nf^{1-14}

5f												
6f												

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Section 3 Electron Configuration

**S-Block is 2 elements wide. P-Block is 6.
D-Block is 10. F-Block is 14.**

1s	1s ¹	
2s	2s ¹	2s ²
3s	3s ¹	3s ²
4s	4s ¹	4s ²
5s	5s ¹	5s ²
6s	6s ¹	6s ²
7s	7s ¹	7s ²

nd^{1-10}

3d									
4d									
5d									
6d									

1s ²						
2p	2p ¹	2p ²	2p ³	2p ⁴	2p ⁵	2p ⁶
3p	3p ¹	3p ²	3p ³	3p ⁴	3p ⁵	3p ⁶
4p	4p ¹	4p ²	4p ³	4p ⁴	4p ⁵	4p ⁶
5p	5p ¹	5p ²	5p ³	5p ⁴	5p ⁵	5p ⁶
6p	6p ¹	6p ²	6p ³	6p ⁴	6p ⁵	6p ⁶

nf^{1-14}

5f													
6f													

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Shells and Subshells

- We have learned the Bohr Model, where electrons live in shells.
- Now we need to learn a little of the Quantum Model
 - In the Quantum Model, **shells** are made of **subshells**:
 - ‘S’ subshell: 2 electrons
 - ‘P’ subshell: 6 electrons
 - ‘D’ subshell: 10 electrons
 - ‘F’ subshell: 14 electrons



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Shells and Subshells

- In the Quantum Model, shells are made of subshells:
 - 'S' subshell: 2 electrons
 - 'P' subshell: 6 electrons
 - 'D' subshell: 10 electrons
 - 'F' subshell: 14 electrons
- The first shell (K) has S only (2 e⁻)
- The second shell (L) has S and P (2+6 = 8 e⁻)
- The third shell (M) has S, P, & D (2+6+10 = 18 e⁻)
- The fourth shell (N) has _ subshells and _ electrons?





Shells and Subshells

- The first shell (K) has S only (2 e⁻)
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Writing Electron Configuration

- Electrons fill as follows : (take a note of this)
 - $1s \rightarrow 2s \rightarrow 2p \rightarrow 3s \rightarrow 3p \rightarrow 4s \rightarrow 3d \rightarrow 4p \dots$
 - Looks like 3d and 4s are out of order. They are. We'll learn more about this later.
- Where do electrons go in Oxygen?
 - 2 in 1s, 2 in 2s, 4 in 2p
 - **Electron Configuration:** $1s^2 2s^2 2p^4$
- **Classwork:** Write the electron configuration for the first 20 elements (H→Ca)

