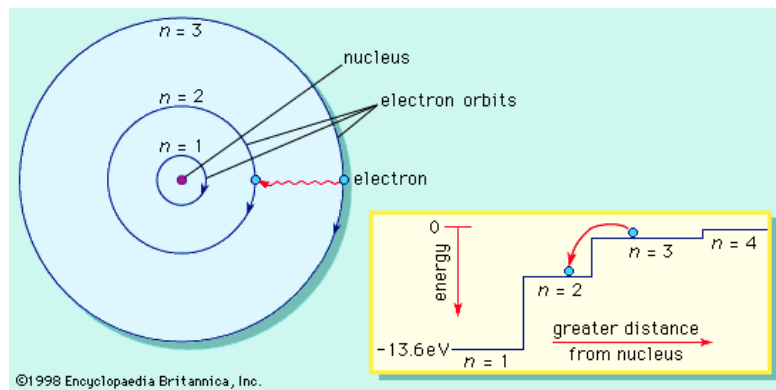


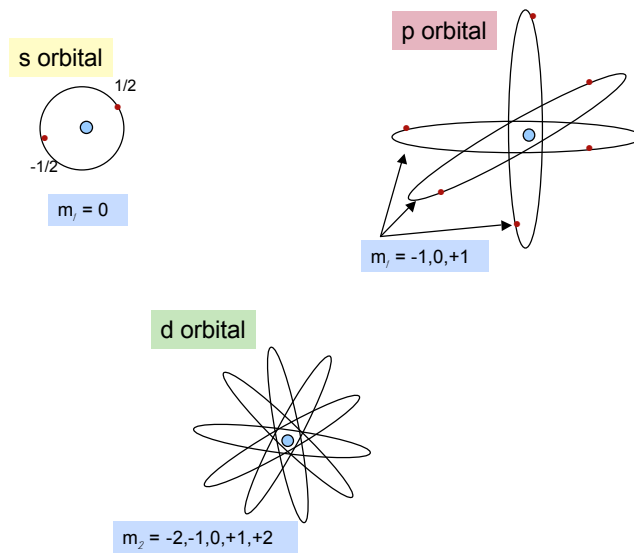
Atomic models



Chapter 2: Atomic bonding and properties

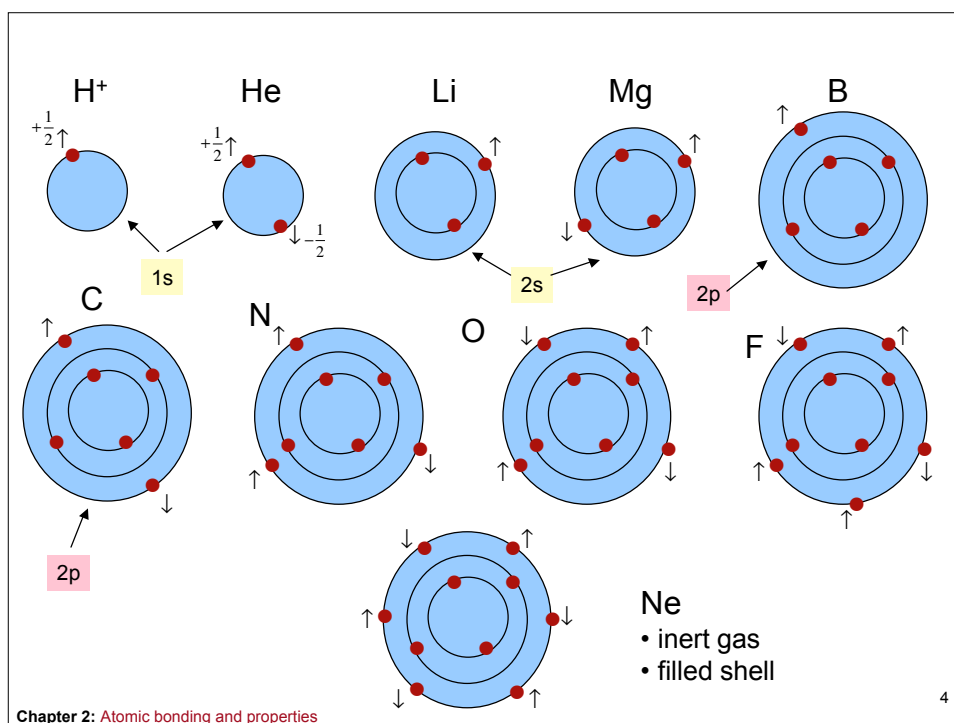
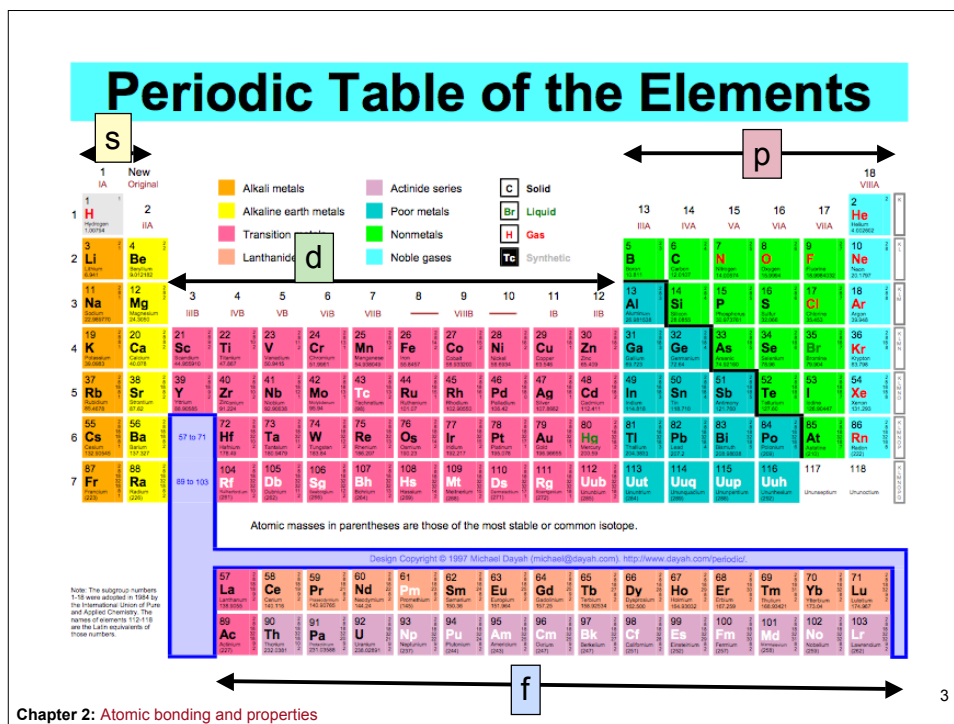
1

Quantum numbers



Chapter 2: Atomic bonding and properties

2



The Periodic Table

- Columns: Similar **Valence** Structure

Valence electron trends:

- Group 1: give up 1e
- Group 2: give up 2e
- Group 3: give up 3e
- Group 16: accept 2e
- Group 17: accept 1e
- Group 18: inert gases

Legend:

- Metal (light blue)
- Nonmetal (dark blue)
- Intermediate (medium blue)

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Chapter 2: Atomic bonding and properties

5

Electronegativity

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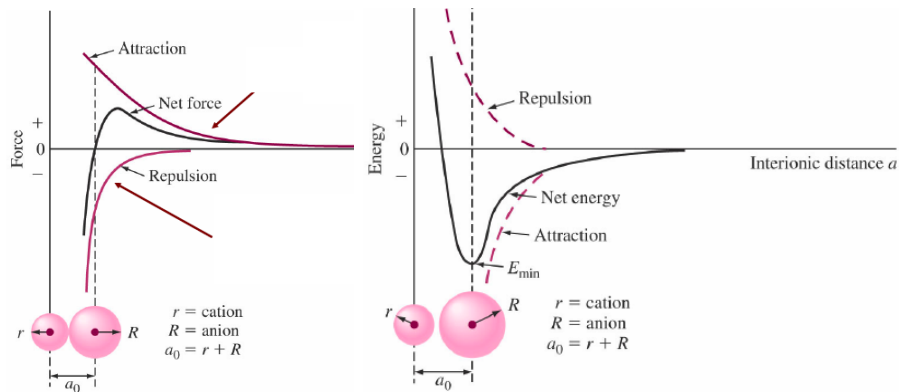
Smaller electronegativity

Larger electronegativity

Chapter 2: Atomic bonding and properties

6

Force and energy vs. separation distance

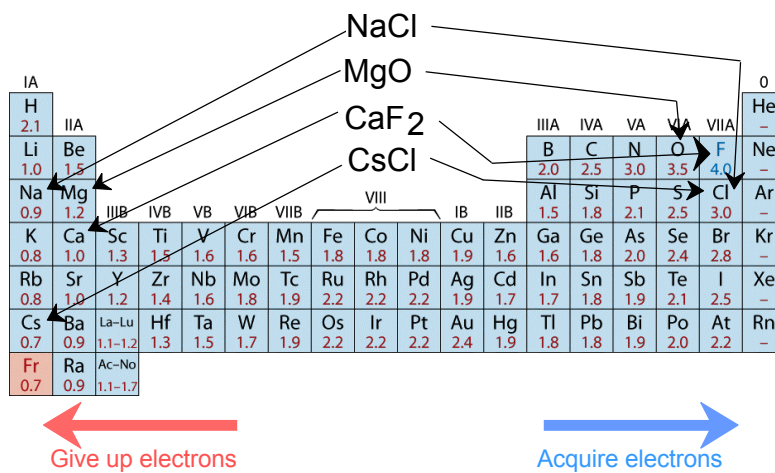


Chapter 2: Atomic bonding and properties

7

Ionic bonding

- Predominant bonding in **ceramics**

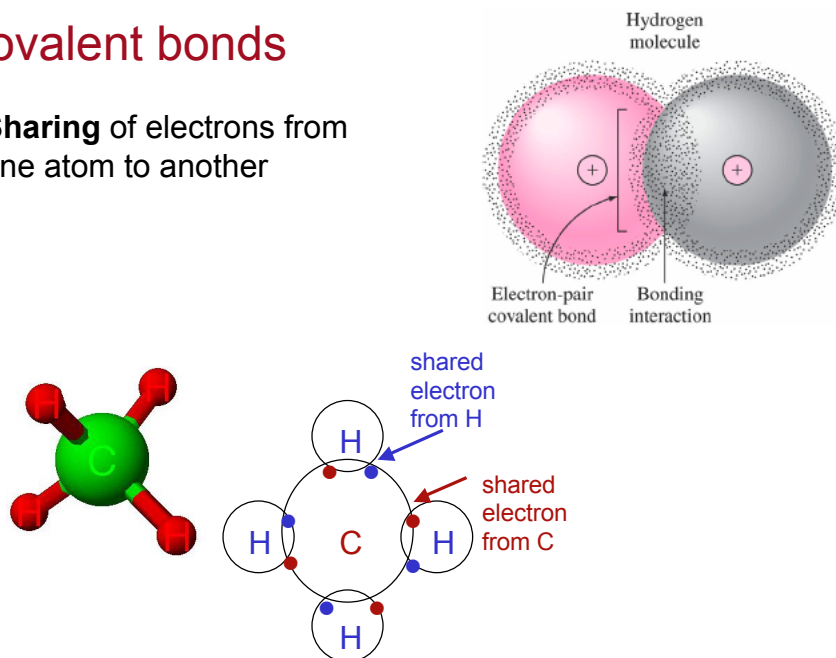


Chapter 2: Atomic bonding and properties

8

Covalent bonds

- ★ **Sharing** of electrons from one atom to another

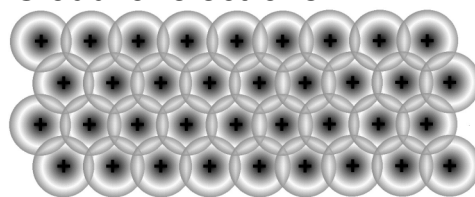


Chapter 2: Atomic bonding and properties

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Metallic bonds

- ★ 'Cloud' of electrons



electron cloud
around + cores

Secondary bonds

- Permanent **dipoles**-molecule induced

-general case:

secondary
bonding

-ex: liquid HCl



-ex: polymer

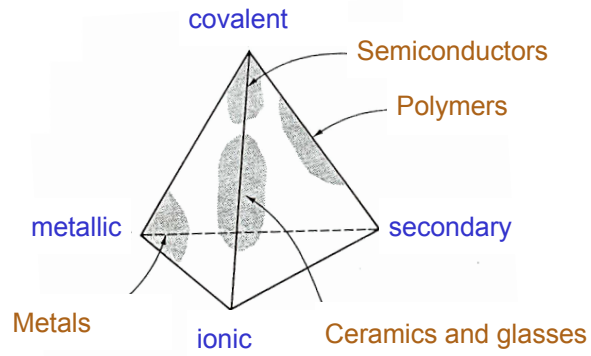


secondary bonding

Chapter 2: Atomic bonding and properties

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Contribution of bond types

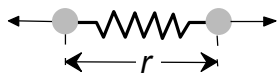


Chapter 2: Atomic bonding and properties

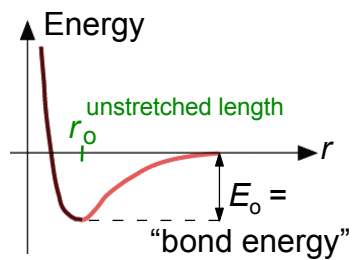
11

Properties from bonding: T_m

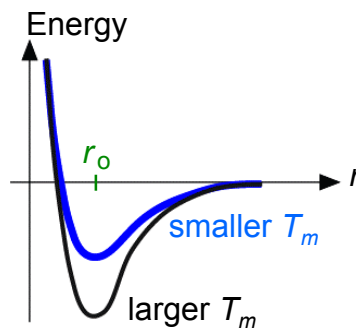
- Bond length, r



- Bond energy, E_0



- Melting Temperature, T_m

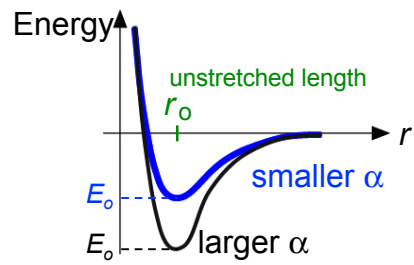
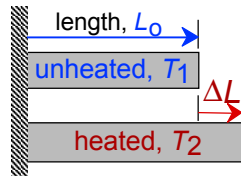


Chapter 2: Atomic bonding and properties

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Properties from bonding: α

- Coefficient of thermal expansion, α



Chapter 2: Atomic bonding and properties

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