

Chapter 7 Summary Notes

Main Concepts

Periodic Trends Key Words

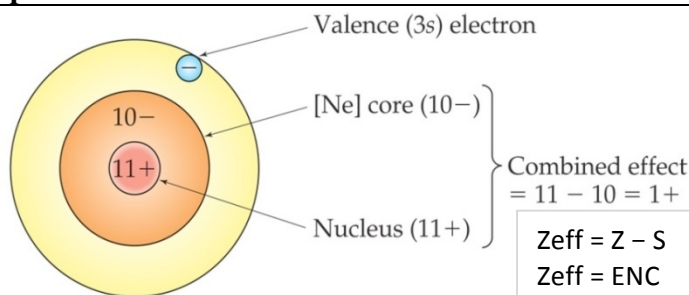
- **Principal Energy Level:** more energy levels means bigger atoms
- **Nuclear Charge (# of p in an atom):** attraction of electrons to nucleus; increased nuclear charge causes atomic radius to decrease
- **Shielding Effect:** inner electrons increase atomic size by reducing the attractive force on outermost electrons
- **Effective Nuclear Charge:** force of attraction felt valence e^- from nucleus; a high ENC means smaller ionic radius (greater attraction to outermost electrons)

Atomic Radius: half distance between two covalently-bonded atoms

Periodic Trends

- **Atomic Radius:** increase going down, decrease going right (more energy levels and shielding going down, higher ENC going right)
- **Size of Ions:** cations smaller than anions (fewer e^- , less e^- repulsion), bigger going down, smaller going right
 - Isoelectronic series have same # of electrons, different # of protons
- **Ionization Energy:** the amount of energy required to remove an electron from the ground state of a gaseous atom or ion.
 - $A_{(g)} \rightarrow A^+ + e^-$
 - Bigger going right, smaller going down
 - Exceptions: between Group 2&13, Group 5&6

Explanations



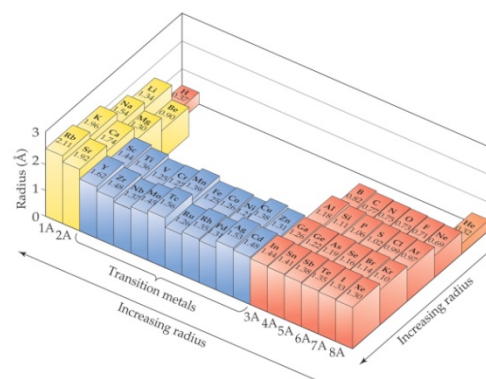
$$Z_{\text{eff}} = Z - S$$

$$Z_{\text{eff}} = \text{ENC}$$

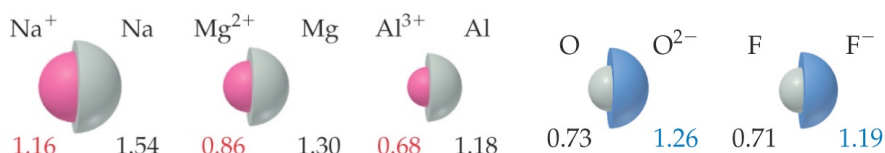
Z = atomic number

S = screening constant (#

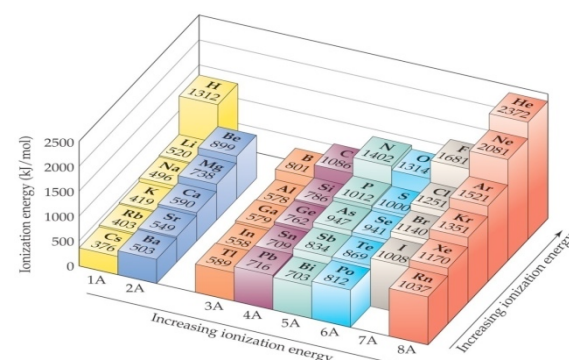
Atomic Radius



Isoelectronic Series



Ionization Energy



Summary of the Chapter and Important things to remember:

Chapter 7 Summary Notes

Main Concepts

Periodic Trends (cont'd)

- **Electron Affinity:** amount of energy required to add an electron to a gaseous atom:
 - $\text{Cl}_{(g)} + e^- \rightarrow \text{Cl}^-$
 - Larger going right, smaller going down
 - Exceptions: between Group 1&2, Group 14&15
- **Electronegativity:** tendency to attract electrons in a covalent bond
 - Increases going up and right

Metals and Nonmetals

- Metals: tend to form cations, metal oxides are basic
- Nonmetals: tend to form anions, nonmetal oxides are acidic, poor conductors of electricity
- Metallic character increases down a group, decreases across a period

Alkali metals (1A)—The most reactive metal family, these must be stored under oil because they react violently with water! They dissolve and create an alkaline, or basic, solution, hence their name.

Alkaline earth metals (2A)—These also are reactive metals, but they don't explode in water; pastes of these are used in batteries.

Halogens (7A)—Known as the “salt formers,” they are used in modern lighting and always exist as diatomic molecules in their elemental form.

Noble gases (8A)—Known for their extremely slow reactivity, these were once thought to never react; neon, one of the noble gases, is used to make bright signs.

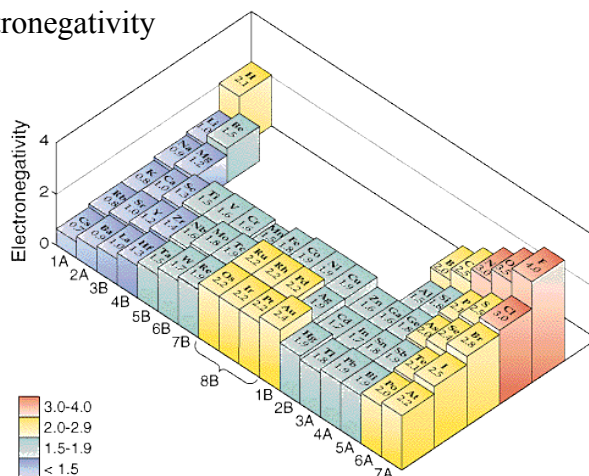
<http://www.sparknotes.com/testprep/books/sat2/chemistry/chapter4section6.rhtml>

Explanations

Electron Affinity

H −73							He > 0
Li −60	Be > 0						
Na −53	Mg > 0	B −27	C −122	N > 0	O −141	F −328	Ne > 0
K −48	Ca −2	Al −43	Si −134	P −72	S −200	Cl −349	Ar > 0
Rb −47	Sr −5	Ga −30	Ge −119	As −78	Se −195	Br −325	Kr > 0
		In −30	Sn −107	Sb −103	Te −190	I −295	Xe > 0
1A	2A	3A	4A	5A	6A	7A	8A

Electronegativity



Summary of the Chapter and Important things to remember: