# Announcements - Lecture VIII- Thursday, Sep 25h

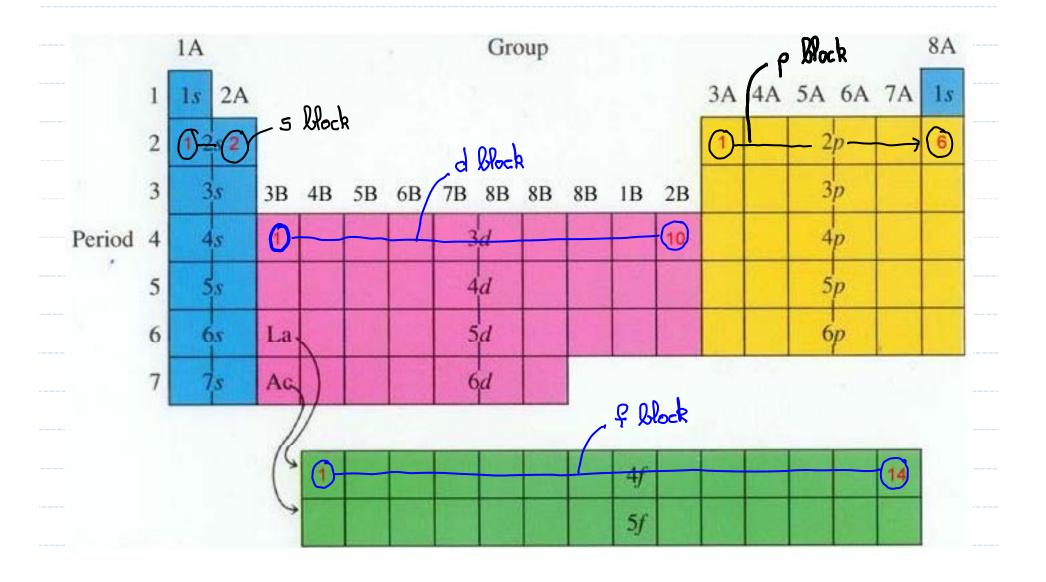
- 1. Exam I Tuesday, September 30<sup>th</sup> In Class
- 2. Second Lab Saturday, October 4<sup>th</sup> ... 1-4pm ... ISB 155/60 (A-E)
  - a) Print lab prior to coming to lab -- use the 'Print Friendly Version' located on the top left hand side of the page this is the version that contains the 'Data Sheet' that you will hand in upon completing the lab.
  - b) First set of Lab Owls will appear in Owl after this lab. There are a total of 4 sets of Lab Owls and they are worth 25% of the Lab Grade.

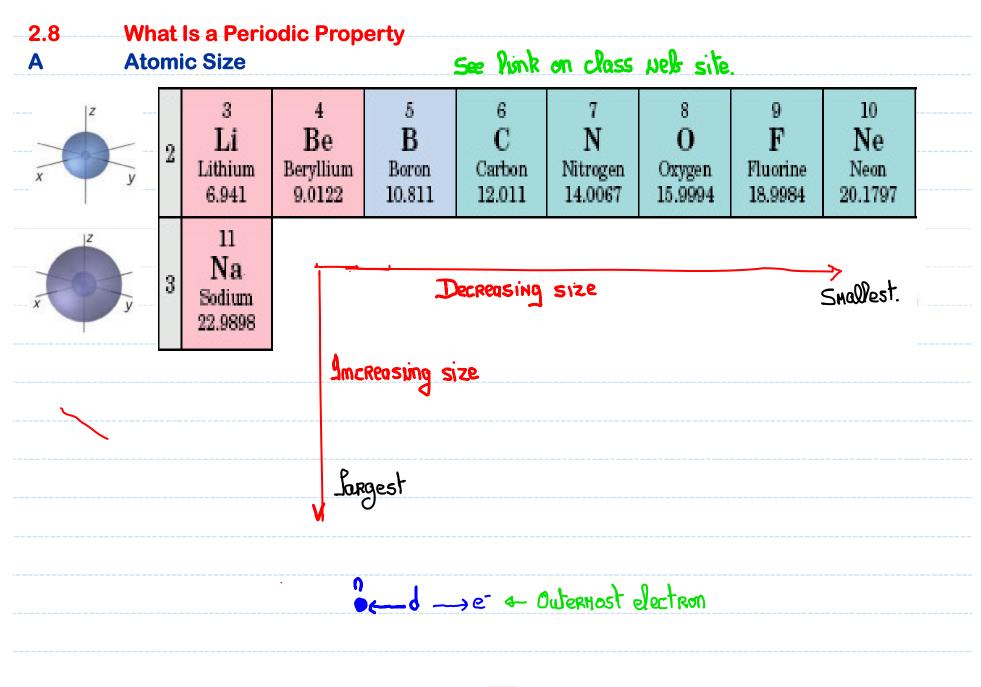


# 2.7 Electronic Configuration and Position in the Periodic Table

				Electron Configuration	Noble Gas	Valence	5	
	1 <i>A</i>	Li	3	1s <sup>2</sup> 2s <sup>1</sup>	[He]2s¹	1	47	
	2A	Be	4	1s <sup>2</sup> 2s <sup>2</sup>	[He]2s²	2		
	3 <i>A</i>	В	5	1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>1</sup>	[He]2s²2p¹	3		
	4A	C	6	1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>2</sup>	[He]2s²2p²	4		GROUP 1A
	5 <i>A</i>	Ν	7	1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>3</sup>	[He]2s²2p³	5		(Charge +1)
	6A	0	8	1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>4</sup>	[He]2s <sup>2</sup> 2p <sup>4</sup>	6	$\neg \mid \cdot \mid$	→ GROUP 2A
	7A	F	9	1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>5</sup>	[He]2s <sup>2</sup> 2p <sup>5</sup>	7	<b>.</b>	
	84	Ne	10	1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>6</sup>	[He]2s <sup>2</sup> 2p <sup>6</sup>	8		(Charge, +2)
				32		ė.	_	
	1 <i>A</i>	Na	11	1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>6</sup> 3s <sup>1</sup>	[Ne] 3s1	1	<del>-</del>	
	2A	Mg	12	<mark>1s²2s²2p</mark> 63s²	[Ne] 3s <sup>2</sup>	2	7	→ Group 7A
	3 <i>A</i>	Al	13	1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>6</sup> 3s <sup>2</sup> 3p <sup>1</sup>	[Ne] 3s²3p¹	3		→ Group 7A (Charge -1)
	4A	Si	14	1s²2s²2p <sup>6</sup> 3s²3p²	[Ne] 3s <sup>2</sup> 3p <sup>2</sup>	4		07
	5A	P	15	1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>6</sup> 3s <sup>2</sup> 3p <sup>3</sup>	[Ne] 3s <sup>2</sup> 3p <sup>3</sup>	5	<u> </u>	
	6A	s	16	1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>6</sup> 3s <sup>2</sup> 3p <sup>4</sup>	[Ne] 3s <sup>2</sup> 3p <sup>4</sup>	6		
	7A	CI	17	<mark>1s²2s²2p</mark> 63s²3p5	[Ne] 3s <sup>2</sup> 3p <sup>5</sup>	7	T	1
}	84	Ar	18	1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>6</sup> 3s <sup>2</sup> 3p <sup>6</sup>	[Ne] 3s <sup>2</sup> 3p <sup>6</sup>	8		

## 2.7 Electronic Configuration and Periodic Blocks





#### A Atomic Size

Arrange the following elements in order of increasing size, by ranking them 1 (smallest) to 5 (largest).

<u>5</u> Mg

<u>2</u> c

3 Si

He

4 Al

Helium 4.0026 6 C 8 3 5 10 Li В N Be Ne F Lithium Beryllium Boron Carbon Nitrogen Oxygen Fluorine Neon 9.0122 12.011 14.0067 20.1797 6.941 10.811 15.9994 18,9984 12 13 14 11 16 17 18 15 Mg Al Na Si P S Cl Ar Magnesium Aluminum Phosphorus Sulfur Chlorine Sodium Silicon Argon 22.9898 24.3050 26.9815 28.0855 30.9738 32.066 35.4527 39.948 19 20 31 32 35 36 33 34 K Kr Ca Ga Ge Às Se  $\mathbf{Br}$ Potassium Calcium Gallium Germanium Arsenic Selenium Bromine Krypton 39.0983 40.078 69,723 72.61 74.9216 78.96 79.904 83,80 37 38 49 50 51 52 53 54 Rb Sr Sn Sb Te T Xe In

Smallest

Mg I C

OP J C

Which element did you rank as 2?

Tin

118.710

Indium

114.82

a) O

Rubidium

85.4678

b) Mg

Antimony

121.757

Tellurium

127.60

d) Si

Strontium

87.62

e) Al



Iodine

126.9045



Xenon

131.29

**B** Ionization Energy

 2	3 <b>Li</b> Lithium 6.941	Be Beryllium 9.0122	5 <b>B</b> Boron 10.811	6 C Carbon 12.011	7 <b>N</b> Nitrogen 14.0067	8 O Oxygen 15.9994	9 F Fluorine 18.9984	10 <b>Ne</b> Neon 20.1797		
 3	11 Na Sodium 22.9898	The amount of energy required to remove the outermost electron from an atom or ion.								

How easy is it to memore the outermost electron? ... Depends on how strongly it is held ... How is this related to size?

Imcreasing Jonization Energy

(Decreasing Size) Jargest Jonization Energy

Decreasing

Jonization

Size)

Energy.

Shallest Jonization Energy

#### **B** Ionization Energy

Arrange the following elements in order of increasing ionization energy, by ranking them 1 (smallest) to 4 (largest).

<u>4</u> C <u>1</u> Ga <u>2</u> Al <u>3</u> Si

He Helium 4.0026 10  $\tilde{\mathbf{C}}$ Li Be В N O Ne F Carbon Lithium Beryllium Neon Boron Nitrogen Oxygen Fluorine 6.941 9.0122 10.811 12.011 14.0067 15.9994 18.9984 20.1797 14 13 11 16 18 12 15 17 Al Si P Na Mg S Cl Ar Sodium Magnesium Aluminum Silicon Phosphorus Sulfur Chlorine Argon 26.9815 28,0855 22,9898 24.3050 30,9738 32,066 35,4527 39.948 31 32 34 36 19 20 33 35 K Kr Ca Ga Ge As Se Br Gallium Potassium Calcium Germanium Arsenic Selenium Bromine Krypton 39.0983 40.078 69.723 72.61 74.9216 78.96 79.904 83.80 38 49 50 52 54 37 51 53 Rb Sr Te Xe Sn Sb In

Largest IE

Ga JC

of  $\mathbf{J}$ 

Which element did you rank as 3?

Tin

118.710

Indium

114.82

a) C

Rubidium

85.4678

b) Ga

Antimony

121.757

c) Al

Strontium

87.62

d) Si



Xenon

131.29

Iodine

126,9045

Tellurium

127.60

## C Electronegativity

 2	Li Lithium 6.941	Be Beryllium 9.0122	5 B Boron 10.811	C Carbon 12.011	7 N Nitrogen 14.0067	8 O Oxygen 15.9994	9 F Fluorine 18.9984	?	
3	Na Sodium 22.9898	altract	altract an electron.						vacency

Where would am electron prefer to reside?...
How is this related to size?

Increasing Electronegativity

(Impressing attractiveness Most electronegative

Decreasing Electronegativity

(Decreasing attractiveness)

Least Electronegative

#### **Periodic Properties** 2.8

**Electronegativity** 

a) Ca

c) P

Which of the above has the greatest electronegativity?



							He Helium 4.0026
 3 <b>Li</b> Lithium 6.941	Be Beryllium 9.0122	5 <b>B</b> Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.0067	8 O Oxygen 15.9994	9 F Fluorine 18.9984	10 Ne Neon 20.1797
 11 Na Sodium 22.9898	Mg Mg Magnesium 24.3050	13 <b>Al</b> Aluminum 26.9815	14 Si Silicon 28.0855	Phosphorus 30.9738	16 S Suffur 32.066	17 Cl Chlorine 35.4527	18 Ar Argon 39.948
 19 <b>K</b> Potassium 39.0983	20 Ca Calcium 40.078	31 Ga Gallium 69.723	32 <b>Ge</b> Germanium 72.61	33 <b>As</b> Arsenic 74.9216	34 Se Selenium 78.96	35 <b>Br</b> Bromine 79.904	36 Kr Krypton 83.80
 37 <b>Rb</b> Rubidium 85.4678	Sr Strontium 87.62	49 In Indium 114.82	50 Sn Tin 118.710	51 Sb Antimony 121.757	Te Te Tellurium 127.60	53 I Iodine 126.9045	54 <b>Xe</b> Xenon 131.29