Radius Practice #2-3

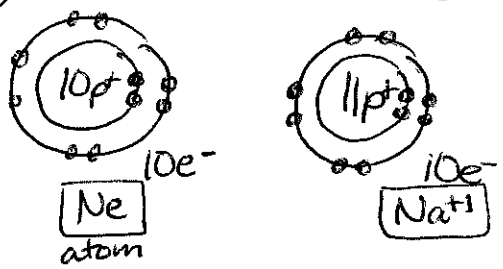
size

1. Which element has greater **Radius**

Coulomb's Law parameter	Ne	Na^{+1}
Energy levels: (distance)	2	2
Number of P^+ (charge)	10 p^+	11 p^+
Number of e^- (repelling)		

look at →

Ne or Na^{+1} **Draw Bohr Diagram**



Explain in a full sentence using Coulomb's Law/energy levels.

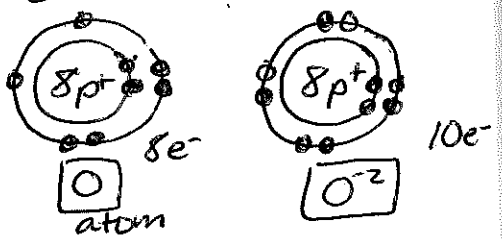
Na^{+1} has a greater nuclear charge (11p^+) compared to Ne (10p^+), so the valence e- of Na^{+1} are more attracted to the nucleus making its radius smaller ← according to Colomb's Law.

2. Which element has greater **Radius**

Coulomb's Law parameter	O	O^{-2}
Energy levels: (distance)	2	2
Number of P^+ (charge)	8 p^+	8 p^+
Number of e^- (repelling)	8 e^-	10 e^-

look at →

O or O^{-2} **Draw Bohr Diagrams**



Explain in a full sentence using Coulomb's Law/energy levels.

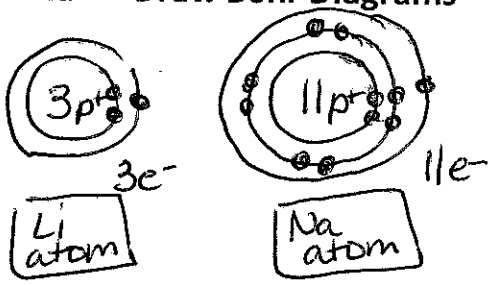
O^{-2} has more electrons than O atom. An increase number of electrons will slightly repel the outer valence eletrons more, making O^{-2} slightly larger.

3. Which element has a greater radius?

Coulomb's Law parameter	Li	Na
Energy levels: (distance)	2	3
Number of P^+ (charge)		
Number of e^- (repelling)		

look at →

Li or Na **Draw Bohr Diagrams**



Explain in a full sentence using Coulomb's Law/energy levels.

The Na atom has 3 energy levels, whereas the Li atom has 2 energy levels. Na has a larger radius because it has more energy levels

For the following indicate (</>) the relative atomic radius. Justify with Coulomb's Law. Circle the atom with more Coulombic attraction of valence electron to the nucleus. ***Explain in a full sentence using Coulomb's Law/energy levels.***

Se > O
4 2

The Se atom is larger than the O atom because Se has 4 energy levels and O has 2 energy levels.

Ca^{+2} < Cl
3 3
20p^+ 17p^+

Ca^{+2} has a greater nuclear charge (20p^+) compared to Cl (17p^+), so the valence electrons of Ca^{+2} are more attracted to the nucleus, making Ca^{+2} a smaller radius

F < F^{-1}
2 2
9p^+ 9p^+
9e^- 10e^-

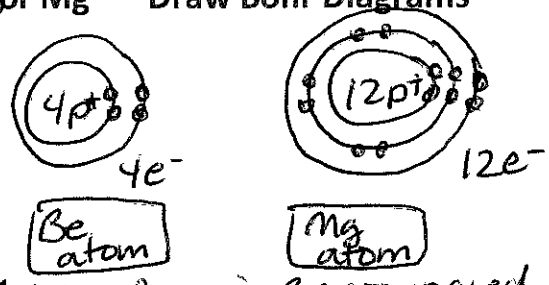
The only difference in F and F^{-1} is the number of electrons. F^{-1} has more electrons, which will repel the outer electrons more, and F^{-1} will be larger

Ionization Energy Practice #2-3

↑ the amount of energy required to remove an electrons

1. Which element has a larger ionization energy? (Be) or Mg **Draw Bohr Diagrams**

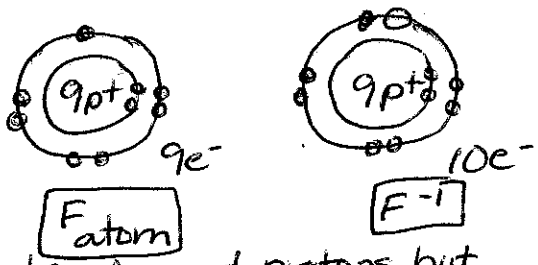
Coulomb's Law parameter	(Be)	Mg
Energy levels: (distance)	2	3
Number of P^+ (charge)		
Number of e^- (repelling)		



Explain in a full sentence using Coulomb's Law/energy levels.
The valence electrons are closer to the nucleus in Be compared to Mg, therefore, according to Coulomb's Law, more energy is required to remove an electron from Be.

2. Which element has a larger ionization energy? (F) or F^{-1} **Draw Bohr Diagrams**

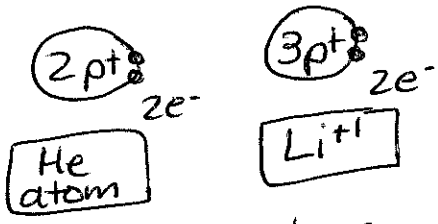
Coulomb's Law parameter	(F)	F^{-1}
Energy levels: (distance)	2	2
Number of P^+ (charge)	9p+	9p+
Number of e^- (repelling)	9e-	10e-



Explain in a full sentence using Coulomb's Law/energy levels.
F and F^{-1} have the same number of ~~p+~~ energy levels and protons, but different number of electrons. More valence electrons on F^{-1} will repel, making the radius slightly larger and requires less energy to remove an electron on F^{-1}

3. Which element has a larger Ionization energy? **He or Li^+ Draw Bohr Diagrar**

Coulomb's Law parameter	He	(Li^{+1})
Energy levels: (distance)	1	1
Number of P^+ (charge)	2p+	3p+
Number of e^- (repelling)		



Explain in a full sentence using Coulomb's Law/energy levels.
Li^{+1} and He both have 1 energy level, but Li^{+1} has more protons, giving Li^{+1} a greater nuclear charge for greater Coulombic attraction ~~to it~~ with its valence electrons. Li^{+1} would require more energy to remove an electron.

For the following indicate (</>) the relative ionization energy. Justify with Coulomb's Law. Circle th atom with more Coulombic attraction of valence electron to the nucleus. ***Explain in a full sentence using Coulomb's Law/energy levels.***

Se < O
4 2
The valence electrons of O are closer to the nucleus and would require more energy to remove an electron from O, according to Coulombs Law.

Ca^{+2} > Cl
3 3
20p+ 17p+
Both Ca^{+2} and Cl have the same number of energy levels, but Ca^{+2} has more protons, giving Ca^{+2} greater Coulombic attraction with its valence electrons, therefore, Ca^{+2} would require more energy to remove an electron

F > F^{-1}
2 2
9p+ 9p+
9e- 10e-
Both F and F^{-1} have the same amount of energy levels + protons, but different amounts of electrons. F^{-1} has 1 more electron which will cause the 35 electrons to repel, making F^{-1} slightly largr an requires less energy to remove an electron.