Name:_____ H. Chem, Period _____

Periodic Trends Worksheet

ATOMIC RADIUS

Draw the trend for ATOMIC RADIUS

1. Define Atomic Radius:

2. Define Electron Shielding:

3. Define Effective Nuclear Charge:

4. What causes the trend in atomic radius you observe as you go down a group/family on the periodic table?

5. What causes the trend in atomic radius you observe as you go across a period on the periodic table?

6. Rank each of the following in order of INCREASING atomic radius
   a. F, Br, At _____ Explain why:

   b. Li, O, F _____ Explain why:

   c. K, Na, P, Cl _____ Explain why for each trend if there are multiple trends.

7. Rank each of the following in order of DECREASING atomic radius

   a. Cl, Br, Ga _____

   b. Ca, Rb, C _____

8. Explain what happens to the size of a sodium atom when it loses an electron. Why?

9. Explain what happens to the size of a chlorine atom when it gains an electron. Why?

10. Place in order from smallest to largest atomic/ ion radius: **Fe** **Fe^{+2}** **Fe^{+}**

11. Place in order from smallest to largest atomic/ ion radius: **O** **O^{-2}** **O^{-}**

12. Place in order from smallest to largest atomic/ ion radius: **Na** **Na^{+}** **Cl**

13. Put in order of increasing size (smallest to largest): **K** **Cl^{-}** **Ar** **S^{-2}**

IONIZATION ENERGY (IE):

Draw the trend for IONIZATION ENERGY

14. Define Ionization Energy:

15. What causes the trend in IE that is observed as you go down a group or family?

16. What causes the trend in IE that is observed as you go across a period?

17. Rank each of the following in order of INCREASING ionization energy

    a. N, O, S, Ge _____

    b. Mg, Ba, Al, Cl _____

18. Rank each of the following in order of DECREASING ionization energy

    a. Cl, Cu, Au _____

    b. Te, Sb, Xe _____

19. The table below gives the ionization energies for **potassium, calcium and bromine**. Identify which element is which from the data given. Explain your answer in the space provided.

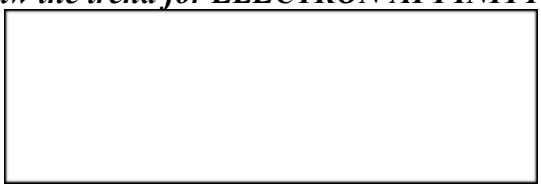
ELEMENT 1			ELEMENT 2			ELEMENT 3	
Ionization energy number	**Enthalpy kJ/mol**		**Ionization energy number**	**Enthalpy kJ/ mol**		**Ionization energy number**	**Enthalpy kJ/mol**
1st	418.8		**1st**	1139.9		**1st**	589.8
2nd	3052		**2nd**	2103		**2nd**	1145.4
3rd	4420		**3rd**	3470		**3rd**	4912.4
4th	5877		**4th**	4560		**4th**	6491

ELEMENT 1 is _____. ELEMENT 2 is _____. ELEMENT 3 is _____.

Explanation:

ELECTRON AFFINITY

Draw the trend for ELECTRON AFFINITY



20. Define Electron Affinity:

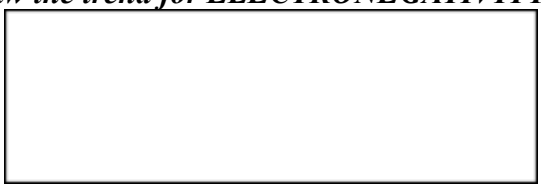
21. An atom has a very negative electron affinity. Circle all the statements that might apply to this atom.
    a. It may be a noble gas.
    b. It becomes less stable when electron is added.
    c. It becomes more stable when electron is added.
    d. It is probably a metal.
    e. It is probably a non-metal.
    f. There is a release of energy when electron is added.
    g. Energy is absorbed when electron is added.

22. The first electron affinity of oxygen is -142 kJ mol-1 .
    a. What does the negative sign in front of the 142 kJ show?

    b. Write the equation which shows the change taking place in the reaction for the first electron affinity for oxygen.

ELECTRONEGATIVITY (EN):

Draw the trend for ELECTRONEGATIVITY



23. Define Electronegativity:

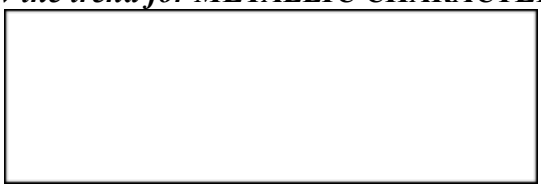
24. Rank each of the following in order of INCREASING electronegativity.
    a. Na, K, Cl _____
    b. Fr, Ca, Co _____

25. Rank each of the following in order of DECREASING electronegativity.
    a. As, S, Sn _____
    b. Rb, Br, I _____

26. Why do most noble gases not have electronegativity values?

METALLIC CHARACTER:

Draw the trend for METALLIC CHARACTER



Define Metallic Character:

General Questions:

27. Based on the concept of periodic trends, answer the following questions for these atoms: Li, Be, Na, Mg. Be able to defend your answers.
    a. Which element has the lowest electronegativity (EN)? _____
    b. Which element has the least metallic character? _____
    c. Which element is the largest atom? _____

28. Based on the concept of periodic trends, answer the following questions for these atoms: P, S, Cl, F. Be prepared to defend your answer.
    a. Which element has the lowest electronegativity (EN)? _____
    b. Which element has the least metallic character? _____
    c. Which element is the largest atom? _____