Ions/Ionic Bonding Chem Part 2/SG #2

p. 398

1. Define an ion: _____

_____

2. Because _____ have a negative charge, losing or gaining an electron will CHANGE the overall charge of an _____.

3. An atom that _____ valence electrons becomes an ion with a _____ charge. This is because the total number of electrons is now _____ than the total number of protons.

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5. To write an ion you write the symbol and then the charge as an exponent

Example Na^{+1} it is also acceptable to write an ion like this: Na^{1+}

In class, I will use the first example to write ions.

p. 399

6. Metal atoms (like sodium and magnesium) become more stable when they _____ valence electrons and form a chemical bond with a _____.

7. When sodium loses one electron it becomes like Ne with ___ total electrons. ____ of those electrons are now _____ electrons. (the electrons in the next lower energy will become valence electrons when electrons are lost) Sodium is now _____ stable. (like a noble gas)

8. Nonmetals (like oxygen and chlorine) will _____ valence electrons from metal atoms. This is because they will now have a stable arrangement of 8 valence electrons. (like a _____ gas)

p. 400

9. Define an ionic bond: _____

_____

10. An example of an ionic bond is _____

11. List the properties of an ionic compound

a. usually _____ and brittle at room temperature

b. high _____ and boiling points

c. Can be _____ in water – becomes a good _____ of electricity because the electric charge can pass from ion to _____ in the solution.

*12. An ionic bond results in an ionic compound that is made up of _____ and negative ions. The total positive charge of all the positive ions _____ the total negative charge of all the negative ions. This makes a _____ ionic compound.

*13. Ionic bonds _____ electrons and usually occur between metals and non metals.

Metallic bonding

p. 401

14. Metal atoms form compounds with one another by _____ or pooling their valence electrons.

15. Define metallic bond: _____

_____

16. Valence electrons in metals are not _____ to one atom, instead a _____ surrounds the positive ions.

17. A good analogy of a metallic bond is to think about filling up your bathtub with golf balls. They will arrange themselves into an orderly fashion. Then turn on the water and the water will fill those gaps. The golf balls are the metal atoms and the water is the sea of electrons they all share. Once the valence electrons detach from their original atomic owners and float around in the sea, the metal atoms become positive ions. The result is an orderly structure of positive metal atoms surrounded by a sea of negative electrons that hold the ions together like glue. This is why metals can conduct heat and electricity, are malleable and ductile, and are shiny.

See the picture on p. 401 for a good visual example.