

Elements and Bonding

Name - _____

1.) Classify each of the following elements as an alkali metal, an alkaline-earth metal, transition metal, metalloid, halogen, or noble gas based on its position in the periodic table:

- a.) boron metalloid
- b.) gold transition metal
- c.) krypton noble gas
- d.) calcium alkaline earth metal

2.) How many valence electrons does each of the following elements have?

- | | | | |
|--------------|---|---------------|---|
| a.) carbon | 4 | b.) xenon | 0 |
| c.) selenium | 6 | d.) potassium | 1 |

3.) Which of the following ions are likely to be formed?

- | | | | |
|---------------|-----|---------------|-----|
| a.) N^{+5} | no | d.) Al^{+2} | no |
| b.) He^{+1} | no | e.) P^{-3} | yes |
| c.) F^{-1} | yes | f.) Mg^{+2} | yes |

4.) Explain why oxygen is a fairly reactive element while neon is not.

Oxygen wants to gain electrons to become like the nearest noble gas, according to the octet rule. Neon has a full outer shell of electrons, so there's no particular reason for it to form chemical compounds.

5.) Explain why beryllium loses electrons when forming ionic bonds, while sulphur gains electrons.

It's easier for beryllium to lose two electrons than gain six to become like the nearest noble gas, and easier for sulfur to gain two electrons than lose six.

6.) Explain why fluorine and chlorine have similar reactivities (the word "valence" should be somewhere in your answer!)

They have the same number of valence electrons, and since valence electrons are what are responsible for chemical reactivity, this gives them similar reactivities.