

Name: _____

Electronegativity is a chemical property that describes the ability of an atom to attract electrons (or electron density) towards itself. An atom's electronegativity is affected by both its atomic weight and the distance that its valence electrons reside from the charged nucleus. The higher the associated electronegativity number, the more an element or compound attracts electrons towards it. First proposed by Linus Pauling in 1932, it has been shown to correlate with a number of other chemical properties.

Electronegativity cannot be directly measured and must be calculated from other atomic or molecular properties. Several methods of calculation have been proposed and, although there may be small differences in the numerical values of the electronegativity, all methods show the same periodic trends between elements.

The most commonly used method of calculation is that originally proposed by Pauling. This gives a dimensionless quantity, commonly referred to as the **Pauling scale**, on a relative scale running from 0.7 to 4.0 (hydrogen = 2.2).

- Electronegativity *increases from left to right* along a period
- For the representative elements (*s* and *p* block) the electronegativity *decreases as you go down* a group
- The transition metal group is not as predictable as far as electronegativity

A general rule of thumb for predicting the type of bond based upon electronegativity differences:

- If the electronegativities are **equal** (i.e. if the electronegativity difference is 0), the bond is non-polar covalent
- If the difference in electronegativities between the two atoms is **greater than 0, but less than 2.0**, the bond is polar covalent
- If the difference in electronegativities between the two atoms is **2.0, or greater**, the bond is ionic

For the following atoms, find the electronegativity value from the periodic table.

- | | | |
|-------|--------|--------|
| 1. F | 10. Cr | 19. Si |
| 2. Br | 11. Au | 20. C |
| 3. H | 12. Ag | 21. B |
| 4. Ag | 13. V | 22. As |
| 5. Ar | 14. W | 23. Se |
| 6. K | 15. Al | 24. I |
| 7. Ca | 16. P | 25. Li |
| 8. Mg | 17. N | 26. Be |
| 9. Fe | 18. O | 27. Sr |

28. Sc

29. Ti

30. Pd

For the following pairs of atoms, circle the one with the most electronegativity.

1. H & Cl

3. Mg & K

5. Na & O

2. Li & H

4. Cs & Cl

6. Al & Fe

7. Mo & S

10. Cl & Si

13. Au & Mn

8. Se & Ca

11. I & Na

14. P & C

9. Al & O

12. S & W

15. Pd & B

Using the periodic table of electronegativities decide which type of bond should be formed between the two atoms.

Covalent / Ionic

Arsenic	Sulfur	1.
Cobalt	Bromine	2.
Germanium	Selenium	3.
Silicon	Fluorine	4.
Potassium	Nitrogen	5.
Nickel	Oxygen	6.
Barium	Tin	7.
Hydrogen	Oxygen	8.
Calcium	Sulfur	9.
Iron	Carbon	10.