Polar Bonds

What are Polar Covalent Bonds?
Covalent bonds occur when the sharing of electrons acts to hold atoms together. However, if two different atoms are being bonded then the electrons will not “hang out” evenly between them.

As a rule of thumb the smaller atoms tend to pull more tightly on electrons than larger ones. So the smaller atom in a bonded pair will tend to hog up more than its share of electrons. The atom that holds more tightly onto electrons will have a small negative charge while the other will have a slight positive charge. A covalent bond is consider polar when this inequality in electron sharing becomes significant.

Identifying Polar Covalent Bonds
One can always determine whether a bond is polar by the difference in electronegativities between the atoms. A difference greater than 0.4 indicates a polar bond. Yet there is another way to determine if a bond between two-non-metals is polar.

A bonding pair must contain Fluorine, Oxygen, Nitrogen, Chlorine or Bromine (these are the diatomic atoms excluding Hydrogen and Iodine). A bond will be polar if it satisfies the following rules:

- Fluorine or Oxygen: Bonded to any other nonmetal.
- Nitrogen, Chlorine or Bromine: The other atom is either a “border element,” Hydrogen, Phosphorous or Iodine.
- Nitrogen: Bonded to Sulfur.

Border elements are nonmetals metals below or to the left of it: Boron, Silicon, Arsenic, Tellurium and Astatine.
Examples: Which of the following bonds are polar?

1. O-H
2. C-P
3. C-Cl
4. B-N
5. Br-H
6. F-F
7. O-Te
8. H-I

Answer: O-H, B-N, Br-H, O-Te

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