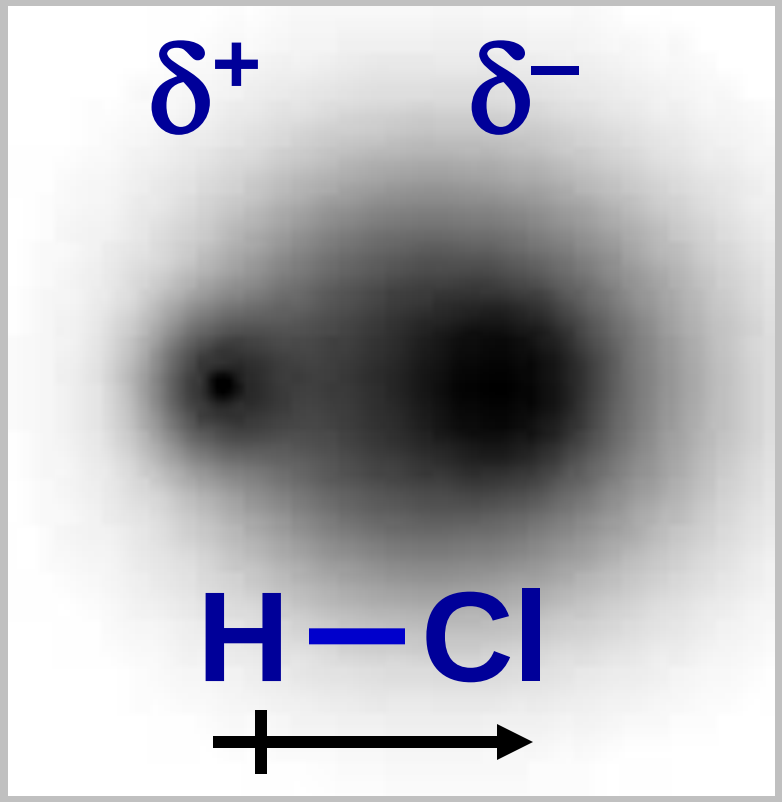
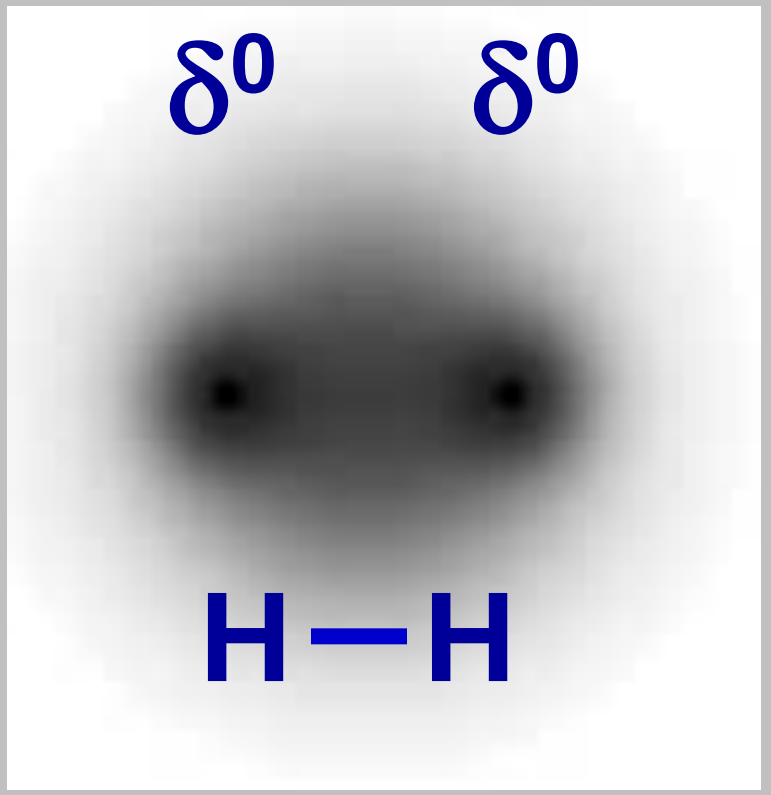
I didn't make all of this PowerPoint. I modified a PowerPoint that I found here:
www.chalkbored.com/lessons/chemistry-12/**electronegativity**.ppt

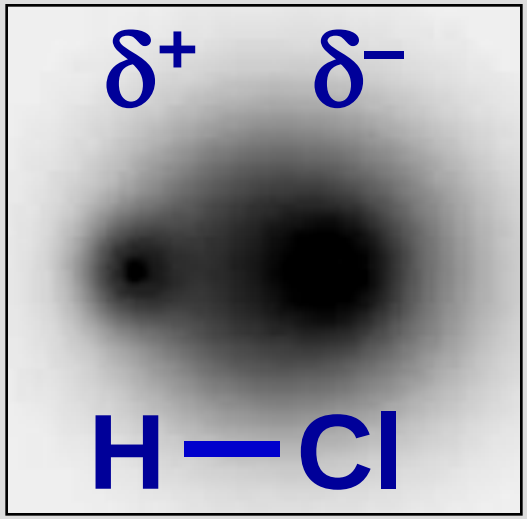
Electronegativity





Electronegativity

- Electronegativity describes how electrons are shared in a compound
- Consider the compound HCl

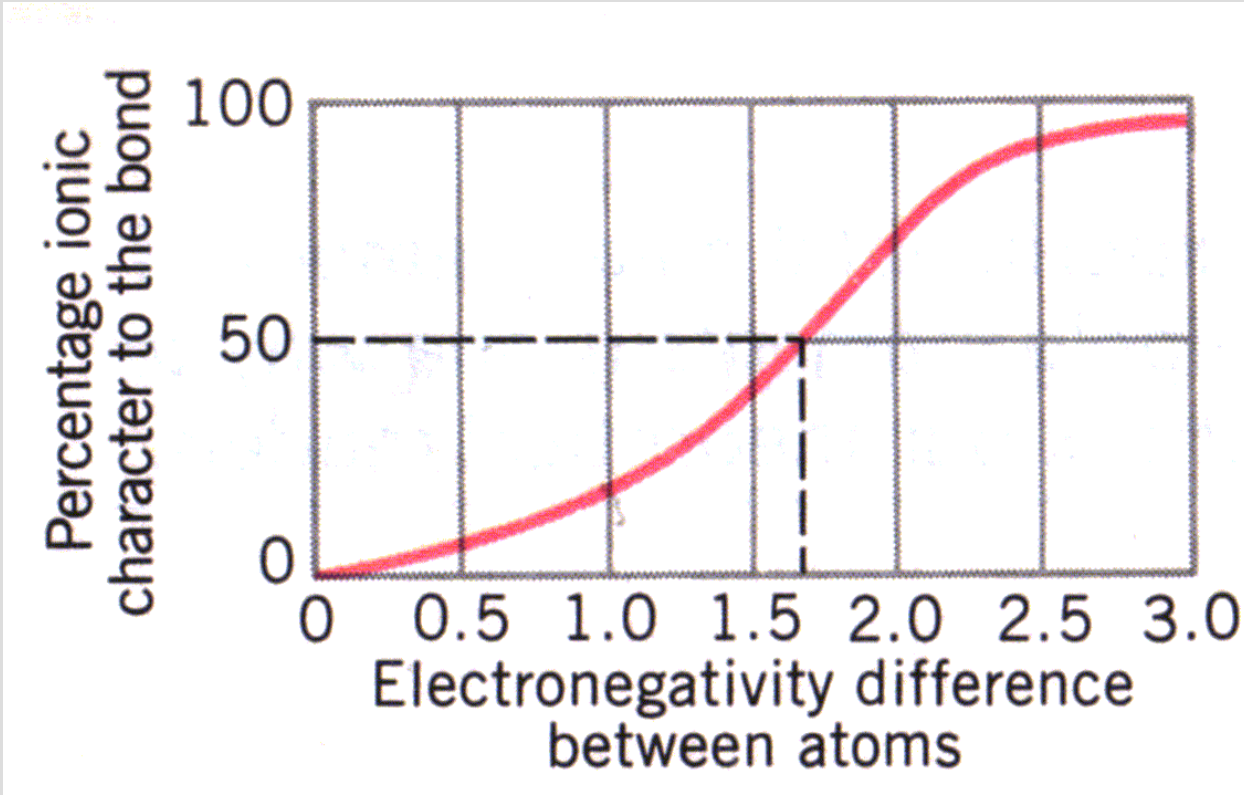


- The electron clouds represent where the two electrons in the HCl bond spend their time (sizes of atoms are not being shown)
- The shared electrons spend more time around Cl than H. In other words Cl is more electronegative than H.

Electronegativity table

- The relative attraction for electrons is summarized in figure 7.11 (pg. 255)
- These numbers are derived from several factors including EA, IE, ENC, atomic radius
- You do not need to understand where the numbers come from
- You need to know that a high number means the element has a greater pull on electrons
- You will also need to calculate the difference between values to estimate the % ionic or % covalent character of a bond
- PE 12 (pg. 256). Reference: 7.10.

Answers


Percentage ionic character to the bond
100
50
0
0
0.5
1.0
1.5
2.0
2.5
3.0
Electronegativity difference between atoms

Calculating EN differences

- The first step in defining the polarity of a bond is to calculate electronegativity difference (Δ EN)
- Δ EN = EN large - EN small
- E.g. for NaCl, Δ EN = 2.9 - 1.0 = 1.9
- Next, estimate from fig 7.12 the % ionic character: about 65% (60 - 70%)

Q-Give the % ionic character for MgO, CH, HCl

MgO = 3.5 - 1.3 = 2.2 … 80% ionic (75-85)

CH = 2.5 - 2.1 = 0.4 … 7% ionic (5 - 10)

HCl = 2.9 - 2.1 = 0.8 … 20 % ionic (15-25)

Note if % ionic is 20%, then % covalent is 80%

Defining polarity

- For our purposes we will define polarity in the following fashion: 0-10 % is non-polar, 10-50% is polar (covalent), 50%+ is ionic
- This is a crude estimate. In reality, the only non-polar bond between 2 atoms occurs in diatomic molecules (O_2: Δ EN = 3.5 - 3.5 = 0)

Q - what is the polarity of the bonds in MgO, CH, HCl?

MgO = 80% ionic = ionic

CH = 7% ionic = non-polar

HCl = 20 % ionic = polar covalent

Polarity in molecules

- A bond that you calculate to be polar may not be polar if the molecule is symmetrical
- Imagine a tug-of-war between atoms of the same strength around a central atom
- The pull in one direction is the bond polarity or “bond dipole”. The overall/molecular polarity is also known as “dipole moment”
- If the pull is the same from all directions then the electrons are not attracted to one atom over another and the molecule is non-polar
- Read 7.11 (bottom of 256 - 259) including the examples. Complete the worksheet.

Polarity in molecules: Examles

	NH_3	NH_4^+	BrCl
Lewis Structure			
ΔEN of bonds			
Bond polarity			
Symmetrical molecule?			
Polarity			