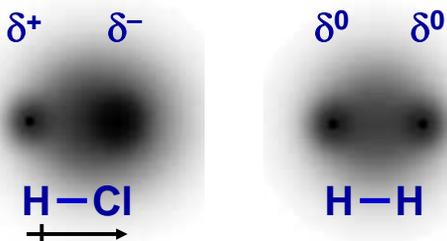
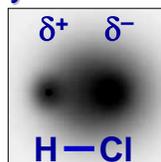


Electronegativity



Electronegativity

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

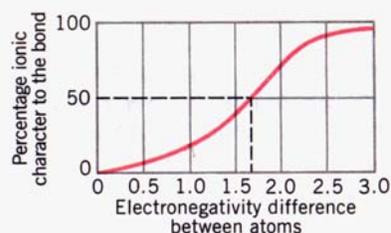


- The electron clouds represent where the two electrons in the HCl bond spend their time (sizes of atoms are not being shown)
- The shared electrons spend more time around Cl than H. In other words Cl is more electronegative than H.

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



Calculating EN differences

- The first step in defining the polarity of a bond is to calculate electronegativity difference (ΔEN)
 - $\Delta EN = EN_{\text{large}} - EN_{\text{small}}$
 - E.g. for NaCl, $\Delta EN = 2.9 - 1.0 = 1.9$
 - Next, estimate from fig 7.12 the % ionic character: about 65% (60 - 70%)
- Q-Give the % ionic character for MgO, CH, HCl

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 : $\Delta EN = 3.5 - 3.5 = 0$)
- Q - what is the polarity of the bonds in MgO, CH, HCl?
- MgO =
CH =
HCl =

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: Examples

	NH ₃	NH ₄ ⁺	BrCl
Lewis Structure			
ΔEN of bonds			
Bond polarity			
Symmetrical molecule?			
Polarity			