

Announcements

Wednesday, April 08, 2009

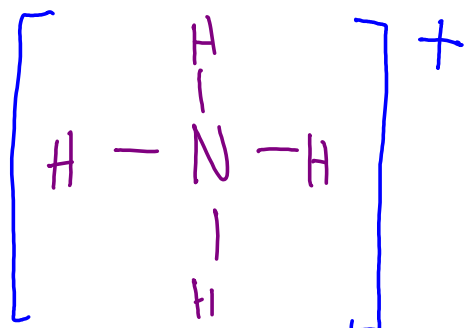
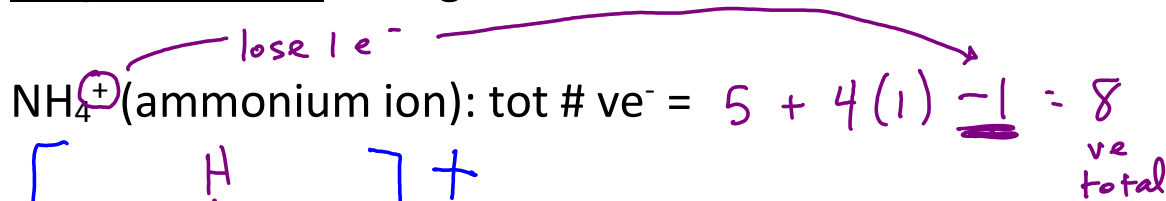
Exam 2 average ~ 73%. Grades are updated in D2L. You can add your lab scores on yourself for now (click Grades in your lab section to see your lab scores).

Ch 10 MasteringChemistry now available - due Monday, April 20.

Discussion assignment 2 - reserve your topic by class next Monday (Apr 13).

Lewis structures of polyatomic ions

Polyatomic ion: charged molecule



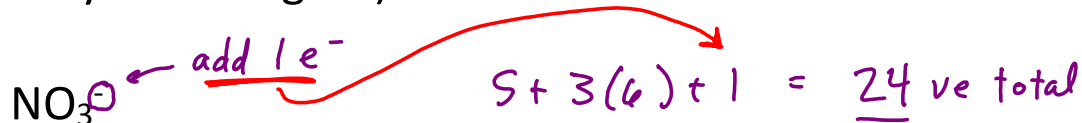
check:

correct tot. #ve⁻? ✓

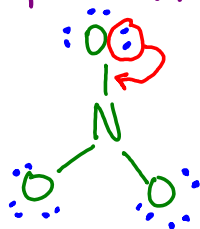
full octets/duets? ✓

N normally only makes 3 bonds. (only applies to neutral molecules)

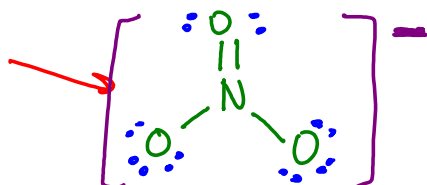
Polyatomic ions do not follow the rules for the normal number of covalent bonds to atoms (this is one reason they are charged!)



** put oxygens around the central atom*

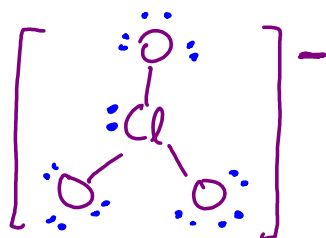


24 - 6 = 18 dots - draw on outside atoms first



** try all single bonds first*

Correct tot ✓
octets ✓



Bonding overview

Ionic

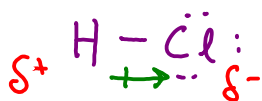


full + and - charges

metal/nonmetal

from transfer of valence e^-

Polar Covalent



nonmetals only
(different EN)

unequal sharing of $2e^-$

(Nonpolar) Covalent



nonmetals only
(similar EN)
H-C etc.

→ equal sharing of pair of electrons

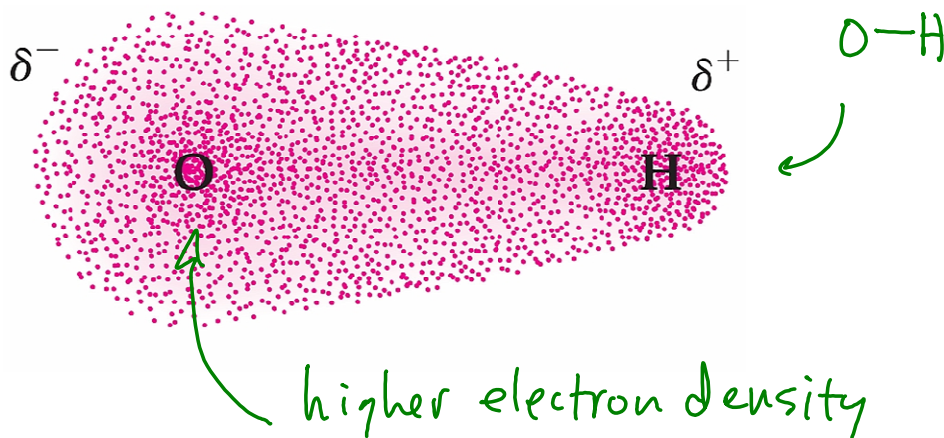
more sharing →

←

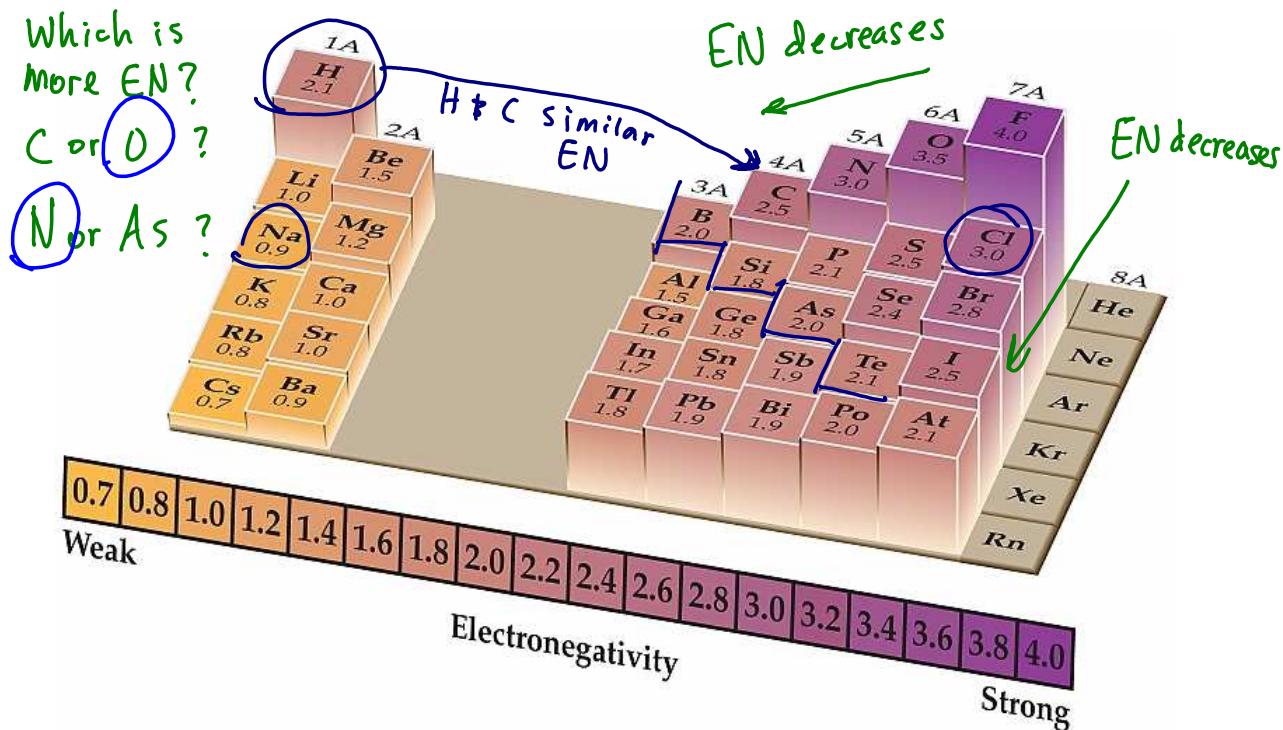
Electronegativity

Electronegativity: tendency of an atom to claim more shared electron density

Oxygen is more electronegative than hydrogen:



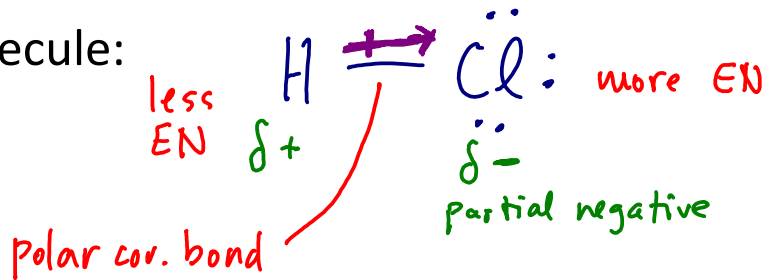
Fluorine is the most electronegative element:



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Polar covalent bonds

An HCl molecule:

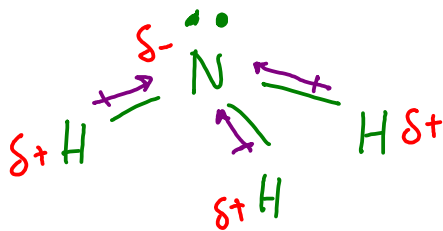


δ = Greek lowercase delta, means "partial"

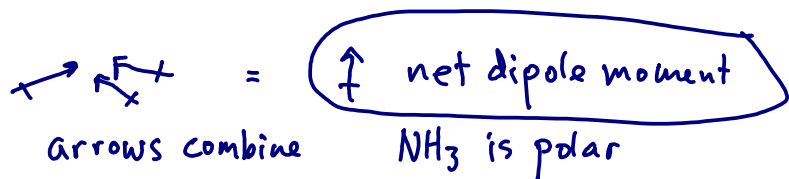
dipole arrow:



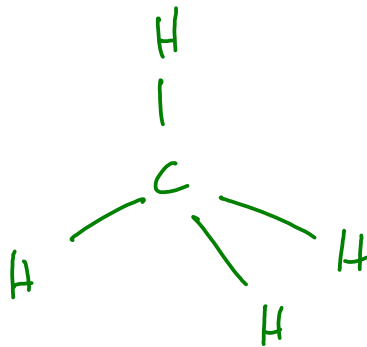
NH_3



NH_3 has polar covalent bonds



CH_4



C & H have similar EN

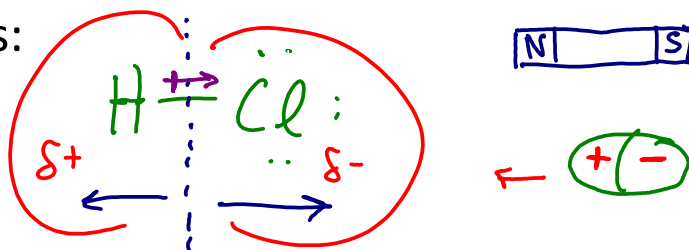
no δ charges, no dipole arrows

CH_4 has noupolar cov. bonds

(CH_4 is nonpolar -
has all nonpolar cov. bonds)

Polarity of molecules

HCl is a **polar** molecule because it can be separated into $\delta+$ and $\delta-$ sides:

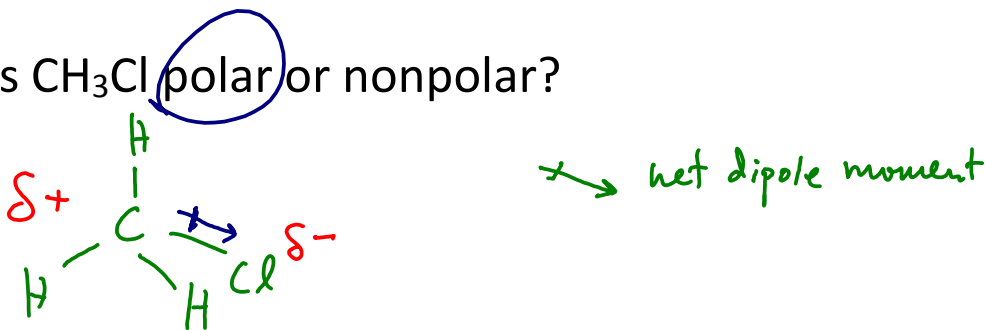


Net dipole moment: one dipole arrow that represents the polarity of the entire molecule. It points from the $\delta+$ side to the $\delta-$ side. \rightarrow for HCl above

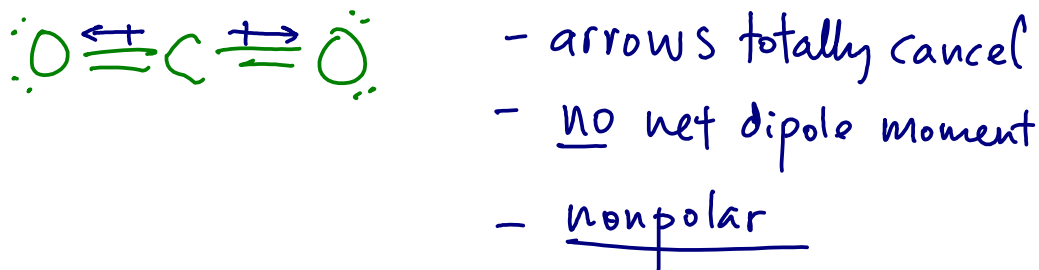
A **nonpolar** molecule:

- cannot be separated into $\delta+$ and $\delta-$ halves
- may have polar bonds that completely cancel each other
- has no net dipole moment

Is CH_3Cl polar or nonpolar?

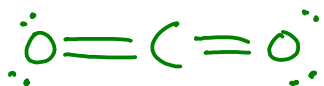


Is CO_2 polar or nonpolar? (draw it with the correct shape)



Shapes of molecules

Linear shape: 2 atoms attached to the central atom, no lone pairs on the central atom



Bent shape: 2 atoms attached to the central atom, lone pairs on the central atom

Trigonal planar shape: 3 atoms on central atom, no lone pairs on central atom

Trigonal pyramidal shape: 3 atoms on central atom, lone pairs on central atom

Tetrahedral shape: 4 atoms attached to central atom

