

Know Something About Chemical Bonding

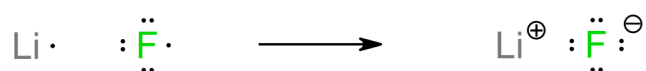
When are Ionic and Covalent bonds formed?

- In General Chemistry you spent a lot of time studying ionic salts, their composition, and their stoichiometry in chemical reactions. While that material is useful it can also be confusing. In the Organic classes we start simple but we need to expand on your understanding of which bonds are most likely to be formed in various situations. Most of this relies on understanding relative electronegativity (EN) values (see earlier).
- In the Organic courses we expand upon the basic idea of “ionic” and “covalent” bonds and invoke the “polar covalent bond” as being essential for reactivity. Ionic bonds will be obvious as they are formed between atoms on the left and right of the Table. When atoms are closer together (and thus have similar EN values) they share bond electrons in covalent arrangements. Some difference in EN values then leads to polar covalent.

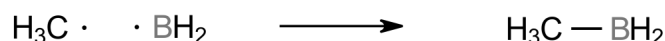
The main bonding patterns seen in Organic Chemistry.

Low EN	Middle EN	High EN
Li Na K	B C N	O F

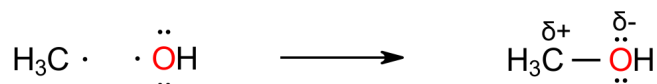
Li with F? Big difference in EN, electron transferred, ionic bonding:



C with B? Small diff. in EN, electrons shared, non-polar covalent bond:



C with O? Decent diff. in EN, electrons shared, polar covalent bond:



- The question will be, “where are the electrons” in each bond? With large differences in EN the electron(s) will be associated completely with the more EN atom. For moderate differences the electrons are shared but closer to the more EN atom to give a dipole. For small EN differences the electrons are equally shared and no dipole exists.