1.4: Fundamental Properties - Electronegativity

An issue with ionization potential and electron affinity is that they are defined and measured as reactions in the gas phase. Although values have been determined for molecular fragments it is still difficult to correlate with reaction trends in solution. To overcome this issue the concept of electronegativity was developed.

Electronegativity is defined as *the tendency of an atom in a molecule to attract electrons to itself*. Although several electronegativity scales have been developed, that by Linus Pauling (Figure 1.4.1.6) is the most often used. Table 1.4.1.5 provides selected Pauling electronegativity values (unit less).

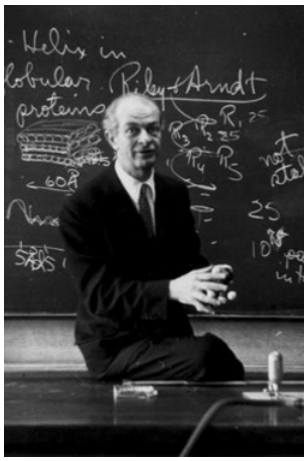

Figure 1.4.6: American chemist Linus Carl Pauling (1901 1994).

Table 1.4.1.5: Selected Pauling electronegativity values.

Element	Pauling Scale
F	4.0
O	3.5
Cl	3.0
N	3.0
S	2.5
C	2.5
H	2.1
B	2.0
Na	0.9

The advantage of the Pauling electronegativity scale is that it allows the prediction of general behavior. For example, the larger the dierence in electronegativity between two elements the more ionic character or more polar the bonding interaction. Thus, a H-O bond (3.5 - 2.1 = 1.4) is more polar than a H-S bond (2.5 2.1 = 0.4).