

# 9 • Bonding & Molecular Structure

## ELECTRONEGATIVITY

1 H 2.1																
3 Li 1.0	4 Be 1.5											5 B 2.0	6 C 2.5	7 N 3.0	8 O 3.5	9 F 4.0
11 Na 1.0	12 Mg 1.2											13 Al 1.5	14 Si 1.8	15 P 2.1	16 S 2.5	17 Cl 3.0
19 K 0.9	20 Ca 1.0	21 Sc 1.3	22 Ti 1.4	23 V 1.5	24 Cr 1.6	25 Mn 1.6	26 Fe 1.7	27 Co 1.7	28 Ni 1.8	29 Cu 1.8	30 Zn 1.6	31 Ga 1.7	32 Ge 1.9	33 As 2.1	34 Se 2.4	35 Br 2.8
37 Rb 0.9	38 Sr 1.0	39 Y 1.2	40 Zr 1.3	41 Nb 1.5	42 Mo 1.6	43 Tc 1.7	44 Ru 1.8	45 Rh 1.8	46 Pd 1.8	47 Ag 1.6	48 Cd 1.6	49 In 1.6	50 Sn 1.8	51 Sb 1.9	52 Te 2.1	53 I 2.5
55 Cs 0.8	56 Ba 1.0	57 La 1.1	72 Hf 1.3	73 Ta 1.4	74 W 1.5	75 Re 1.7	76 Os 1.9	77 Ir 1.9	78 Pt 1.8	79 Au 1.9	80 Hg 1.7	81 Tl 1.6	82 Pb 1.7	83 Bi 1.8	84 Po 1.9	85 At 2.1
87 Fr 0.8	88 Ra 1.0	89 Ac 1.1														

- In each pair of bonds, put a star (★) next to the more polar bond and use an arrow (+→) to show the direction of polarity in each bond.
  - C—O and C—N
  - P—Br and P—Cl
  - B—O and B—S
  - B—F and B—I
- For each of the bonds listed below, indicate (+→) which atom is the more negatively charged.
  - C—N
  - C—H
  - C—Br
  - S—O

It is somewhat artificial to classify bonds based on the differences in the electronegativities ( $\Delta_X$ ) of the two atoms. However, we will use these ranges to do so:

Ionic	$\Delta_X > 1.7$	(symbolized as $A^+$ and $Z^-$ )
Polar Covalent	$1.7 \geq \Delta_X \geq .5$	(symbolized as $A^{\delta+}$ and $Z^{\delta-}$ )
Pure Covalent	$\Delta_X < .5$	(no charges)

- For each of the bonds listed below, classify each bond and indicate full or partial charges, if any.
  - Na—Cl
  - C—O
  - Cu—O
  - C—H
  - Mg—H
  - Cs—F
  - Cl—Cl
  - Al—Cl