Bond Length, Bond Strength, and Electronegativity

Define bond length The minimum energy distance between nuclei in a covalent bond.

What is bond dissociation energy, D? The amount of energy required to break a chemical bond in an isolated molecule in the gas state.

Order the following by increasing bond length.

H—Se H—O H—Te H—S

H—O < H—S < H—Se < H—Te

Order the following by increasing bond strength.

H—Se H—O H—Te H—S

H—Te < H—Se < H—S < H—O

Electronegativity _increases_ going across a period and

decreases going down a group on the periodic table.

Order the following elements from smallest to largest electronegativity.

Br K F S O

K < Br < S < O < F

Classify the following bonds as polar, nonpolar, or ionic.

Cs—F Se—O Al—Cl C—O H—P

Ionic polar polar polar nonpolar

Electronegativity Values

1A	2A											3A	4A	5A	6A	7A	8A
H 2.1																	He
Li 1.0	Be 1.5											B 2.0	C 2.5	N 3.0	O 3.5	F 4.0	Ne
Na 0.9	Mg 1.2											Al 1.5	Si 1.8	P 2.1	S 2.5	Cl 3.0	Ar
K 0.8	Ca 1.0	Sc 1.3	Ti 1.5	V 1.6	Cr 1.6	Mn 1.5	Fe 1.8	Co 1.9	Ni 1.9	Cu 1.9	Zn 1.6	Ga 1.6	Ge 1.8	As 2.0	Se 2.4	Br 2.8	Kr
Rb 0.8	Sr 1.0	Y 1.2	Zr 1.4	Nb 1.6	Mo 1.8	Tc 1.8	Ru 2.2	Rh 2.2	Pd 2.2	Ag 1.9	Cd 1.7	In 1.7	Sn 1.8	Sb 1.9	Te 2.1	I 2.5	Xe
Cs 0.7	Ba 0.9	La 1.1	Hf 1.3	Ta 1.5	W 1.7	Re 1.9	Os 2.2	Ir 2.2	Pt 2.2	Au 2.4	Hg 1.9	Tl 1.8	Pb 1.9	Bi 1.9	Po 2.0	At 2.1	Rn