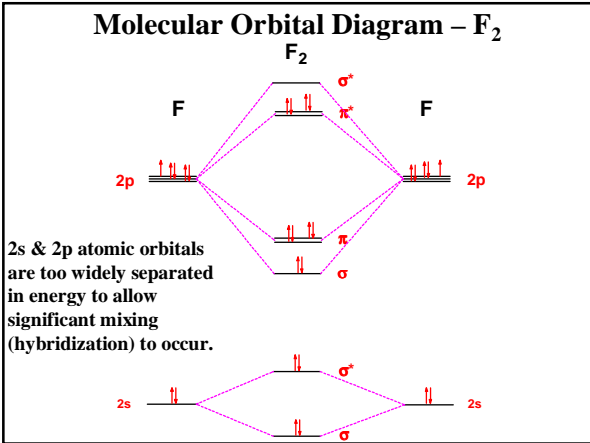


Greenwood & Earnshaw
 2nd Edition
Chapter 17
The Halogens
Fluorine, Chlorine, Bromine, Iodine
and Astatine

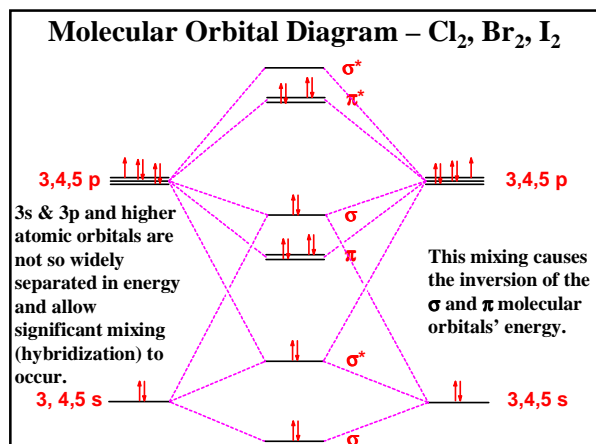


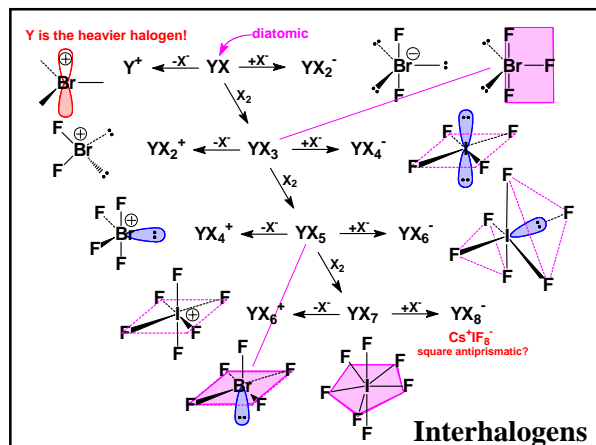
Bond Energies for the Halogens, kJ/mol

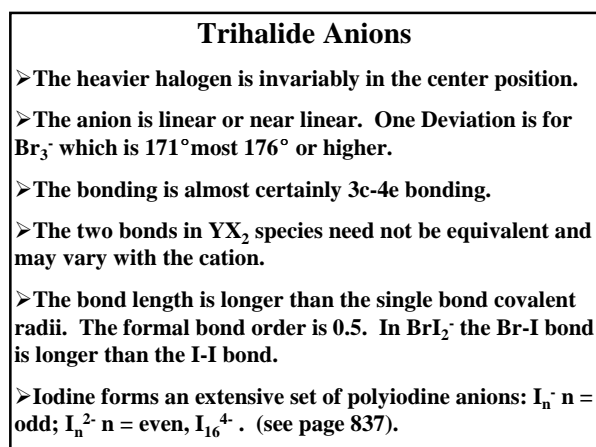
X	XX	HX	BX ₃	AlX ₃	CX ₄
F	159	574	645	582	456
Cl	243	428	444	427	327
Br	193	363	368	360	272
I	151	294	272	285	239

Fluorine bond energies are “anomalous”. The F-F bond is very weak due to lone-pair/lone-pair repulsions (cf. O-O, N-N). Fluorine has tightly held, non-polarizable electrons, the atoms are small and no low-lying “d” atomic orbitals exist. The fluorine lone pairs are strong π-donors to atoms having low-lying empty orbitals. Fluorine forms strong π-bonds to carbon, hydrogen and many other elements. Fluorine is very electrophilic and strongly oxidizing.

X ₂	F ₂	Cl ₂	Br ₂	I ₂	At ₂
E°/V	2.866	1.395	1.087	0.615	~0.3







Iodine Oxides and Oxoacids of Iodine

