

(7) Today

Next Class (8)

3.1 Lewis Structures

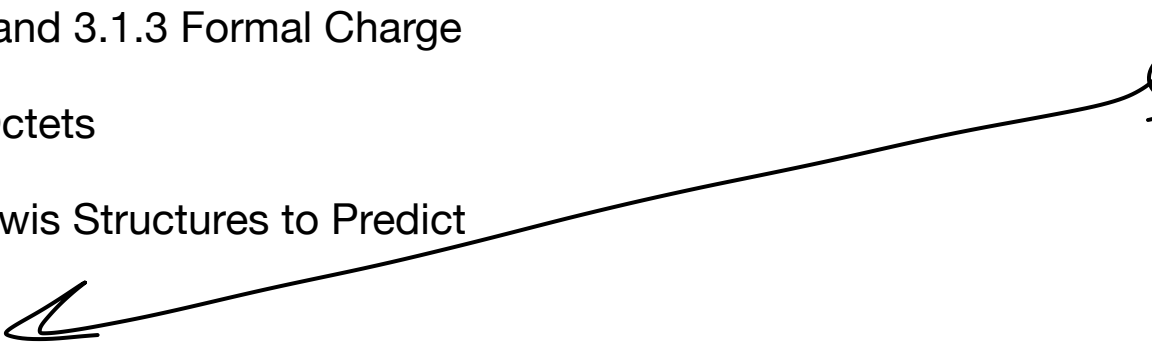
3.1.4 Failure of Lewis Structures to Predict Unusual Cases

3.1.1 Resonance and 3.1.3 Formal Charge

3.1.2 Expanded Octets

3.1.4 Failure of Lewis Structures to Predict Unusual Cases

3.2 VSEPR



(9) Second Class from Today

Third Class from Today (10)

3.2 VSEPR

4.1 Symmetry elements and Operations

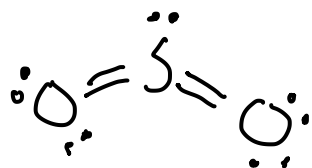
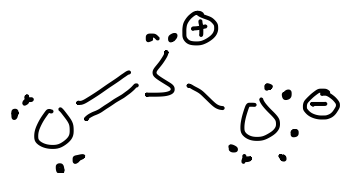
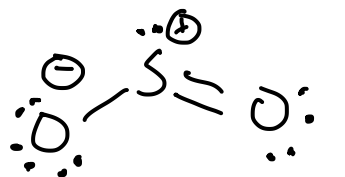
3.3 Molecular Polarity

4.2 Point Groups

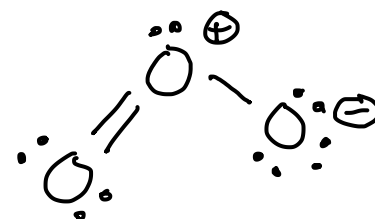
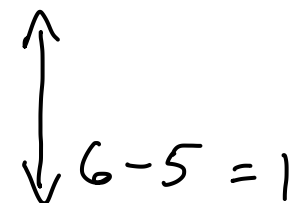
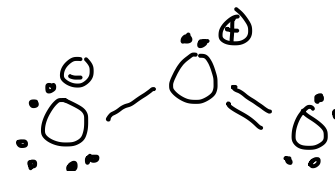
SO₂

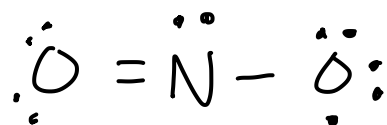
vs

O₃



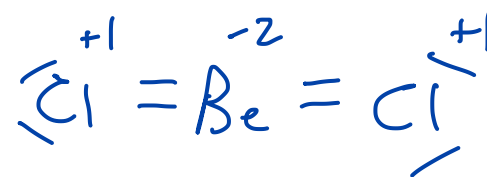
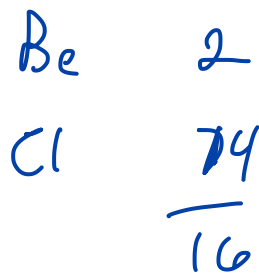
$$FZ_s = 6 - 6$$



NO₂

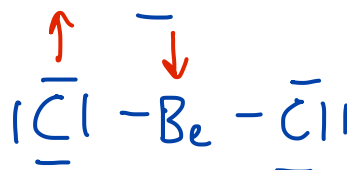
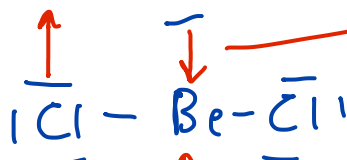
↑
7 e⁻'s

Lewis structures fail
to deal with
radicals

BeCl₂

$$7 - 6 = 1$$

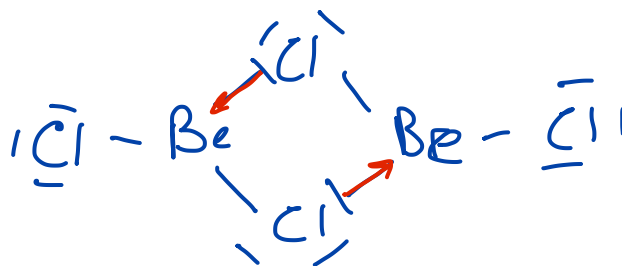
solid state



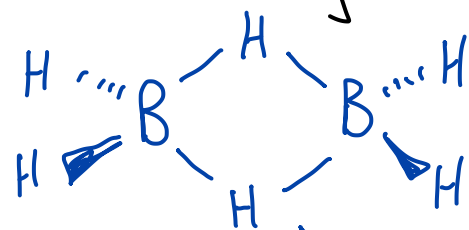
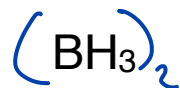
a "dative" bond: lp e⁻'s
are donated but still
"owned" by Cl



gas phase



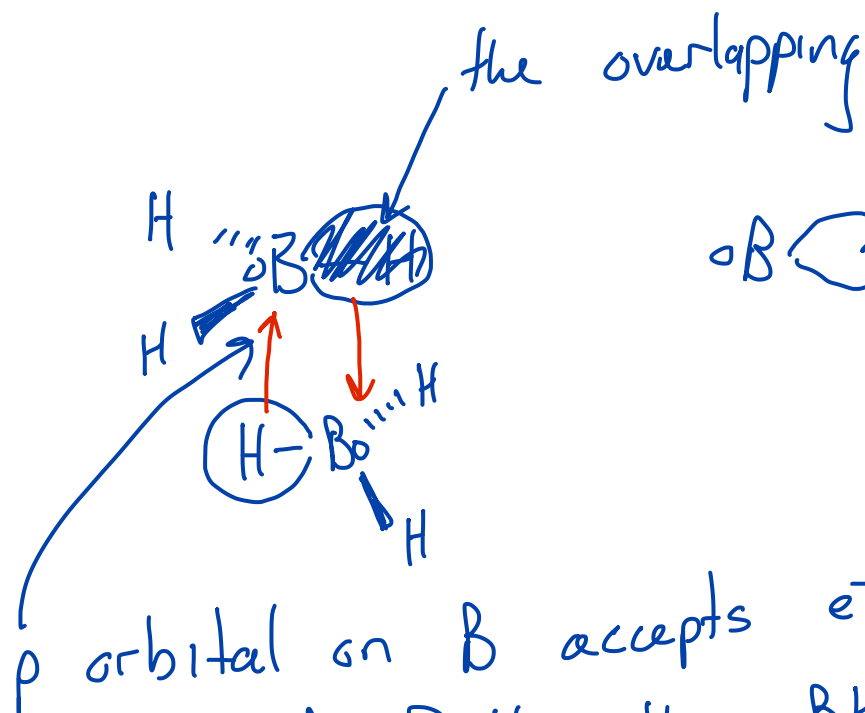
H atom can only make 1 $2e^-$ bond



I thought you said

H could only form 1 bond?

3 center $2e^-$ bond between B + H + B



p orbital on B accepts e^- density from the B to H bond of the other BH_3 and they form a 3 center $2e^-$ bond

VSEPR

Section 3.2

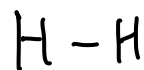
steric #: # of groups of e^- 's that repel each other
connect to the central atom

1

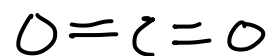
2

3

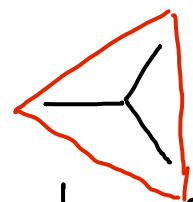
4



linear



linear

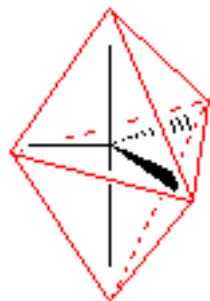


trigonal
planar



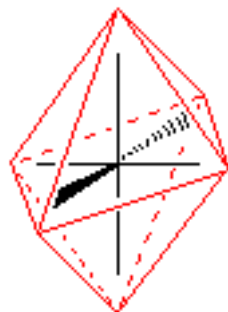
tetrahedral

5



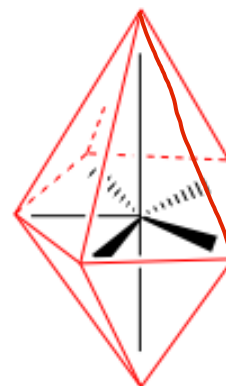
trigonal
bipyramidal

6



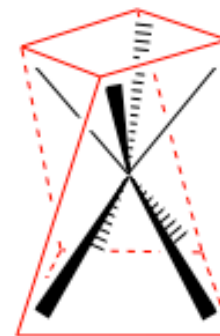
octahedral

7

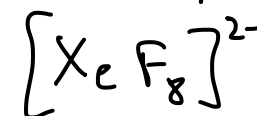


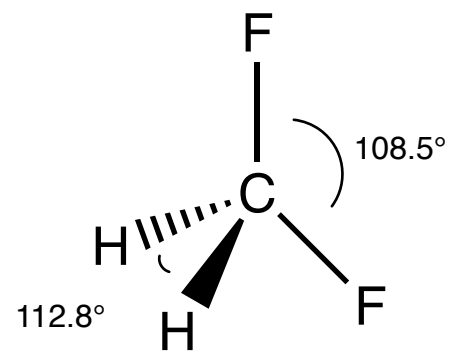
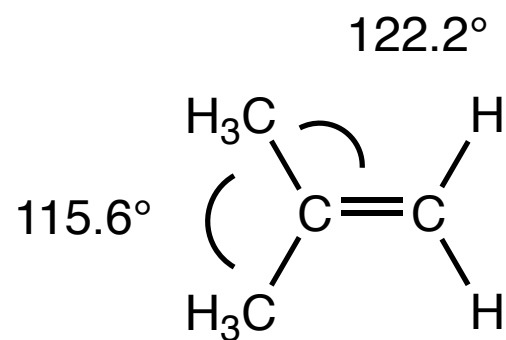
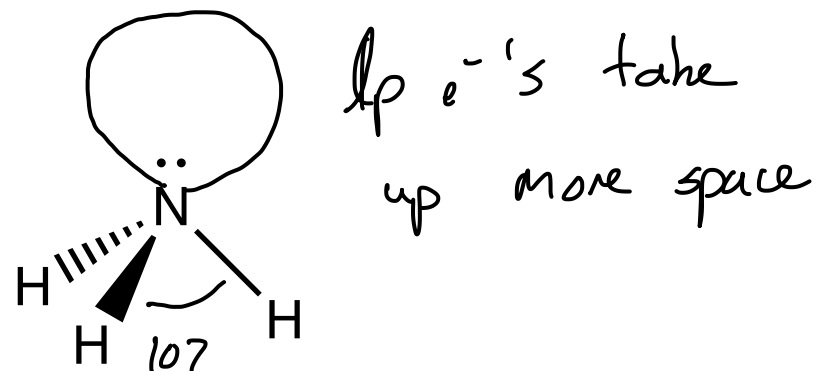
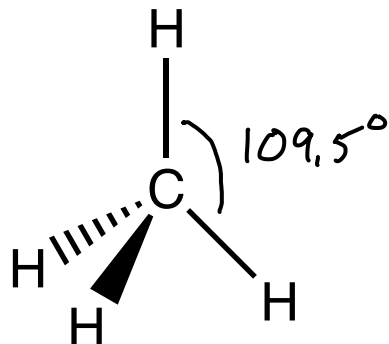
pentagonal
bipyramidal

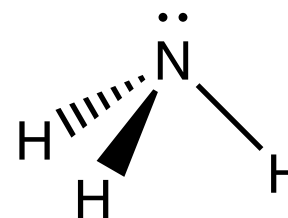
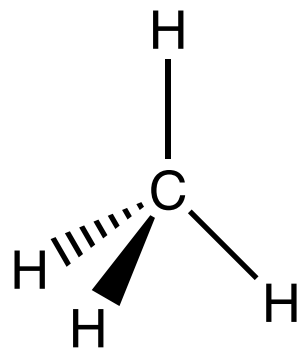
8

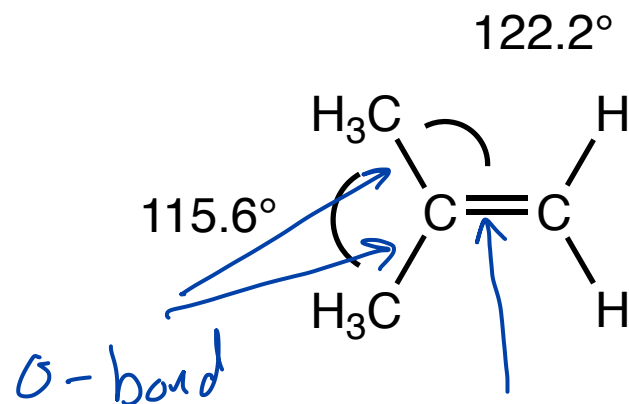


square
antiprismatic





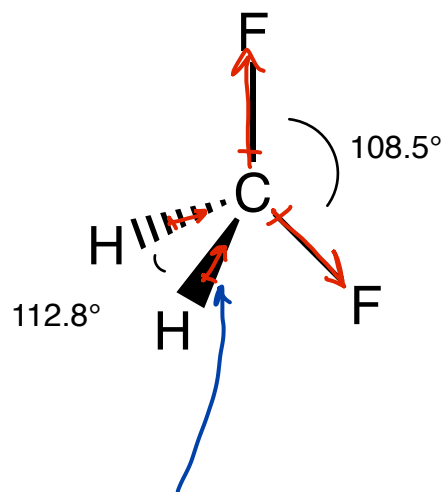




σ bond + π bond

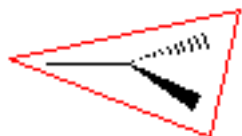
π bond increases $e^- - e^-$ repulsion

so $\sigma + \pi$ take up more space
(db)
than σ (single)



eneg atoms pull e^- density away from the central atom so there is less $e^- - e^-$ repulsion

eneg C atom pulls e^- density towards the central atom which increases repulsion



v-shaped

linear



pyramidal



bent