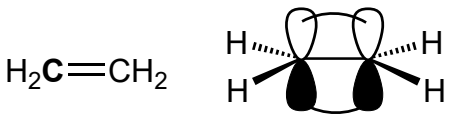
Chapter 2 Summary (Klein textbook) - Molecular Representations & Resonance

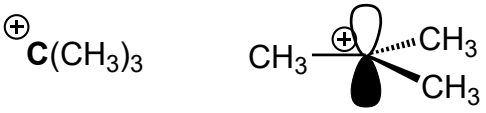
(Klein section numbers, **SB** = SkillBuillers, **CC** = Conceptual Checkpoints)

I. Condensed formulas, bond-line drawings (2.1, 2.2, **SB 2,1, 2.2**)
   A) 3D bond-line structures (2.6)
II. Identifying lone pairs and formal charges (2.4, 2.5, **SB 2.3, 2.4**)
III. Resonance (2.7-2.12)
   A) moves π and nonbonded electrons in *p* orbitals to stabilize a molecule (2.7, 2.9, **SB 2.6**)
   B) curved arrows show the redistribution of electron density (2.8, **SB 2.5**)
   C) resonance forms can be ranked (find most important contributor, etc.) (2.11, **SB 2.7**)
   D) drawing a resonance hybrid (2.12, **SB 2.8**)
   E) identifying localized and delocalized lone pairs (2.13, **SB 2.9**)
      a. sp^2 hybridization for atoms involved in resonance
   F) three general types (*i.e.*, things to look for) (2.10, **CC** 2.18-2.25):
      a. lone pair next to a π bond ("allylic" lone pair)
      b. vacancy next to a π bond (allylic carbocation/empty *p* orbital)
      c. bond between two different atoms (carbonyl-like)
IV. Introduction to Functional Groups (FG) (2.3)

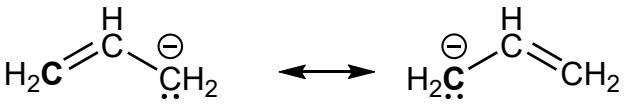
A *p* orbital can be part of a pi bond, can contain an allylic lone pair, or can be empty.



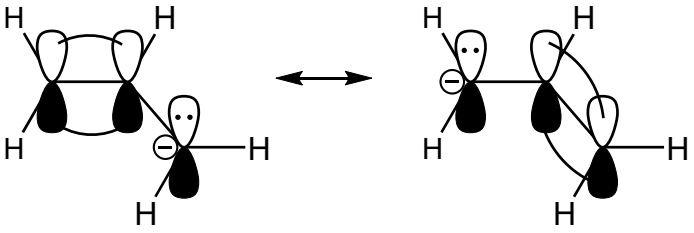
This sp^2-hybridized **C** forms a π bond with an adjacent *p* orbital.



This sp^2-hybridized **C** has an empty *p* orbital (carbocation).



All three carbon atoms are sp^2-hybridized.



This sp^2-hybridized **C** is involved in resonance. It contains a partial π bond and δ- charge.

The resonance hybrid: