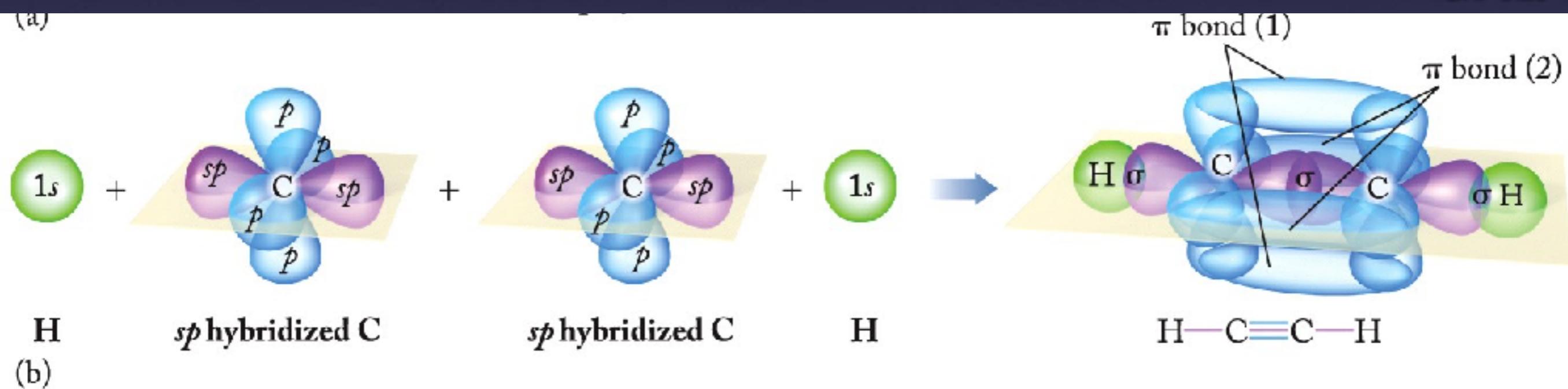
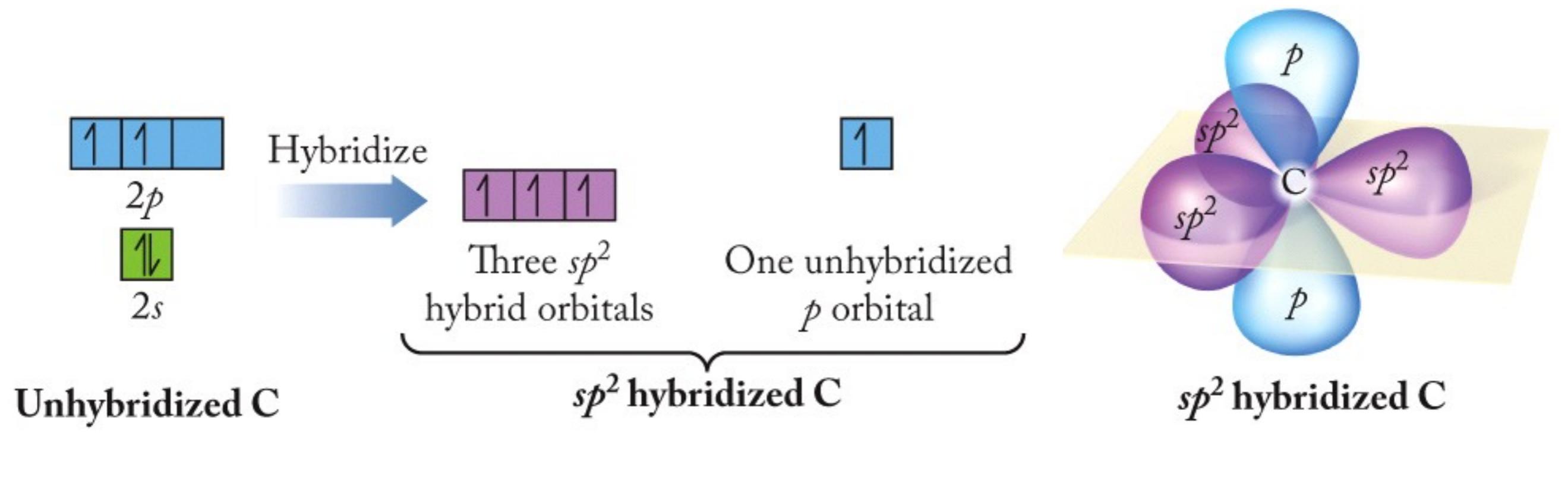
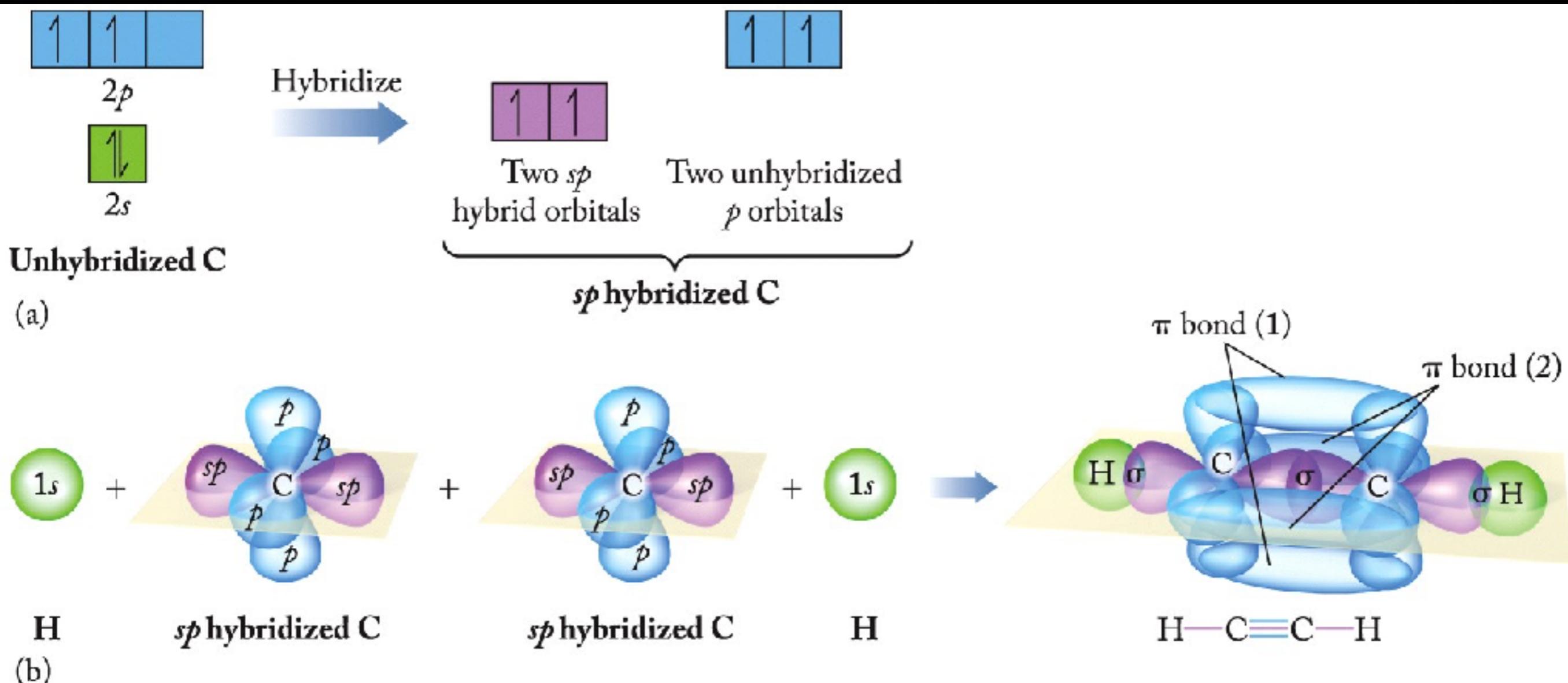


Previously in Molecularity...





Pi bonds have **one** node that is coplanar with the atoms

Upcoming Schedule

- Monday / Tuesday
§6.4-6.5 Molecular Orbital Theory
- Wednesday — Recitate!
- Thursday / Friday
Ch 11. Intermolecular phorces and fase diagrams
- Next Monday / Tuesday
§4.10-4.11 Composition of compounds, combustion analysis
§1.8-1.9 Isotopes, mass spectrometry
- Next Wednesday — Recitate!
- Next Thursday — Exam 3, Fin.

A photograph of a silver fork standing upright in a field of lavender. The fork's tines are pointing downwards, and its handle is pointing upwards. In the background, there is a paved road leading towards a line of trees under a clear blue sky.

Where are we going today?

Ch1010-A17-A03 Lecture 20

- § 6.4 Molecular orbitals

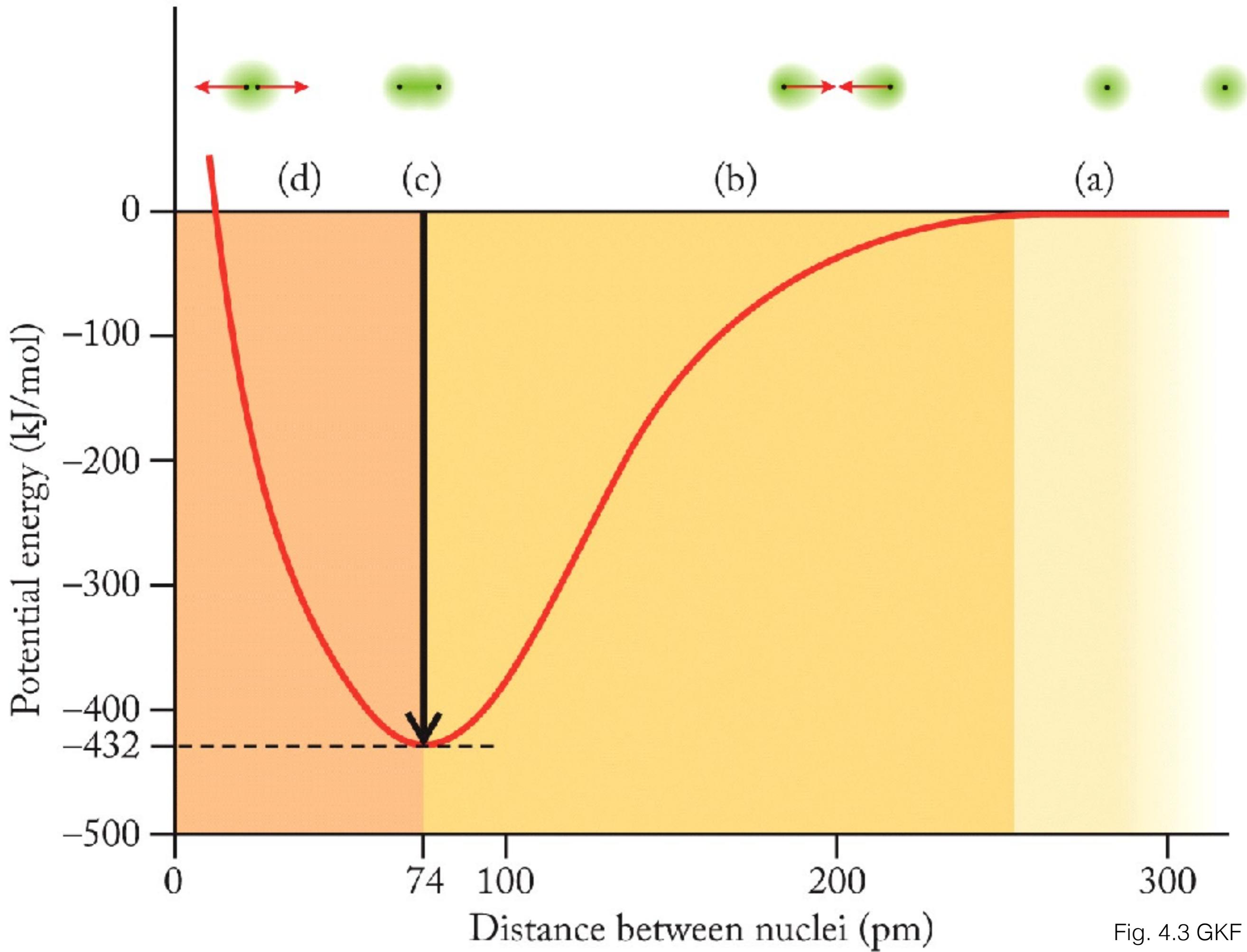
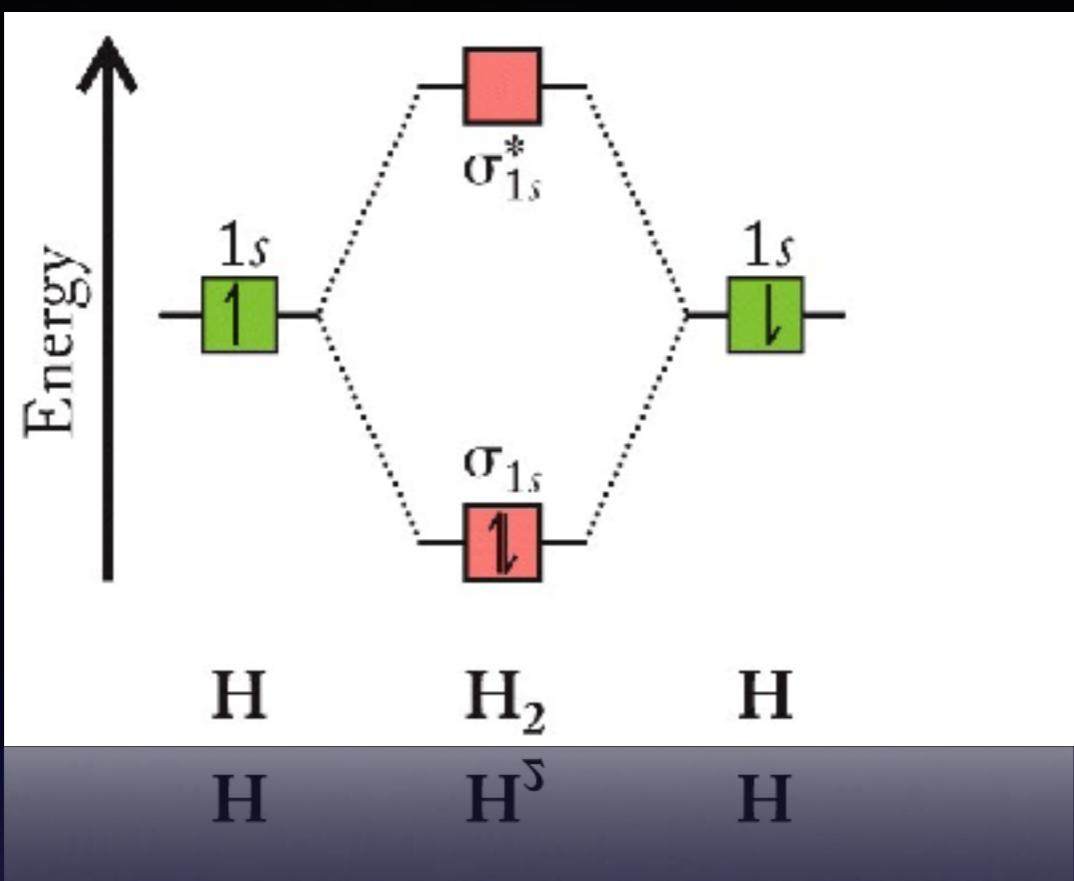


Fig. 4.3 GKF



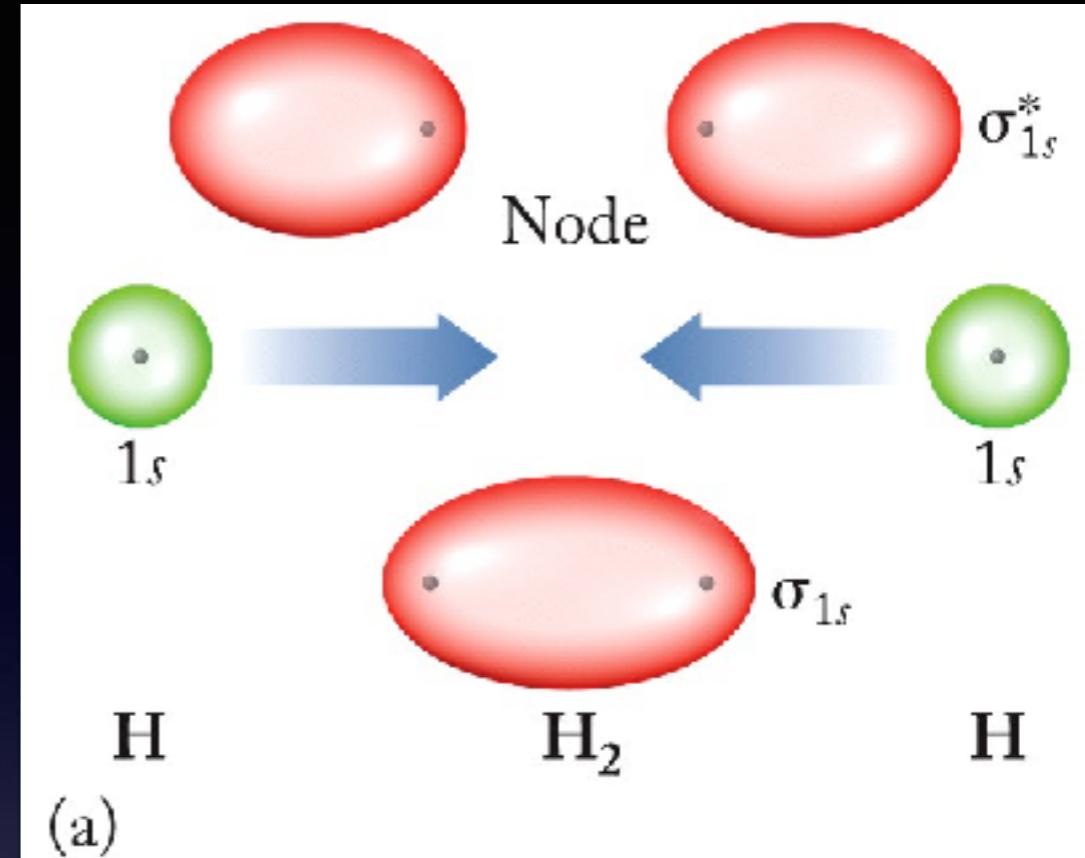
What is the bond “order”

$$\text{Bond order} = \frac{1}{2} \left[\left(\begin{array}{c} \text{number of} \\ \text{bonding electrons} \end{array} \right) - \left(\begin{array}{c} \text{number of} \\ \text{antibonding electrons} \end{array} \right) \right]$$

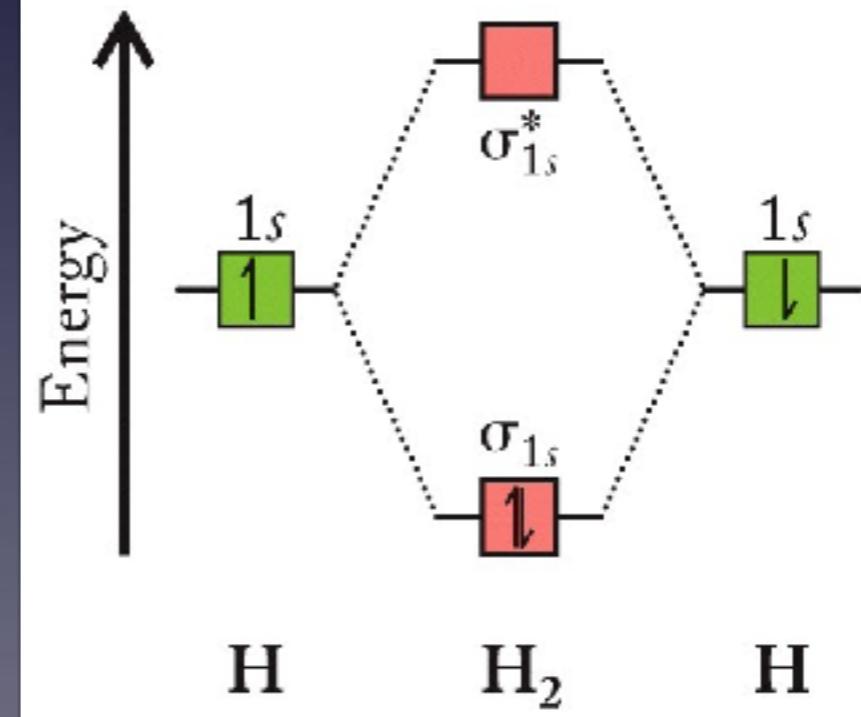
- BO = 1 is a single bond
BO = 2 is a double bond
...
- Half-integer bond orders are also a thing!
- If the bond order is zero, the “molecule” will fall apart

Orbital mixing rules...

- When combining x atomic orbitals to make molecular orbitals...
- ...you must end up with x molecular orbitals!
- Ch1010ers are responsible for orbital phase that is not shown in the Tro figures!



(a)



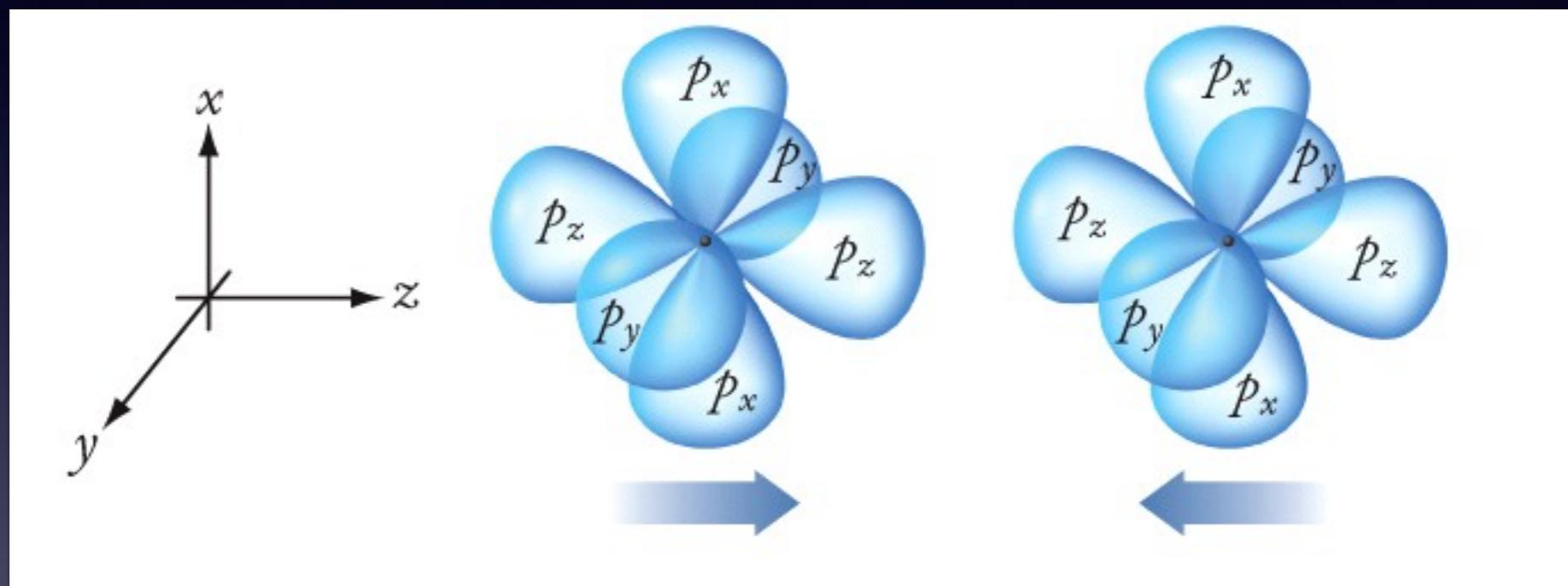
(b)

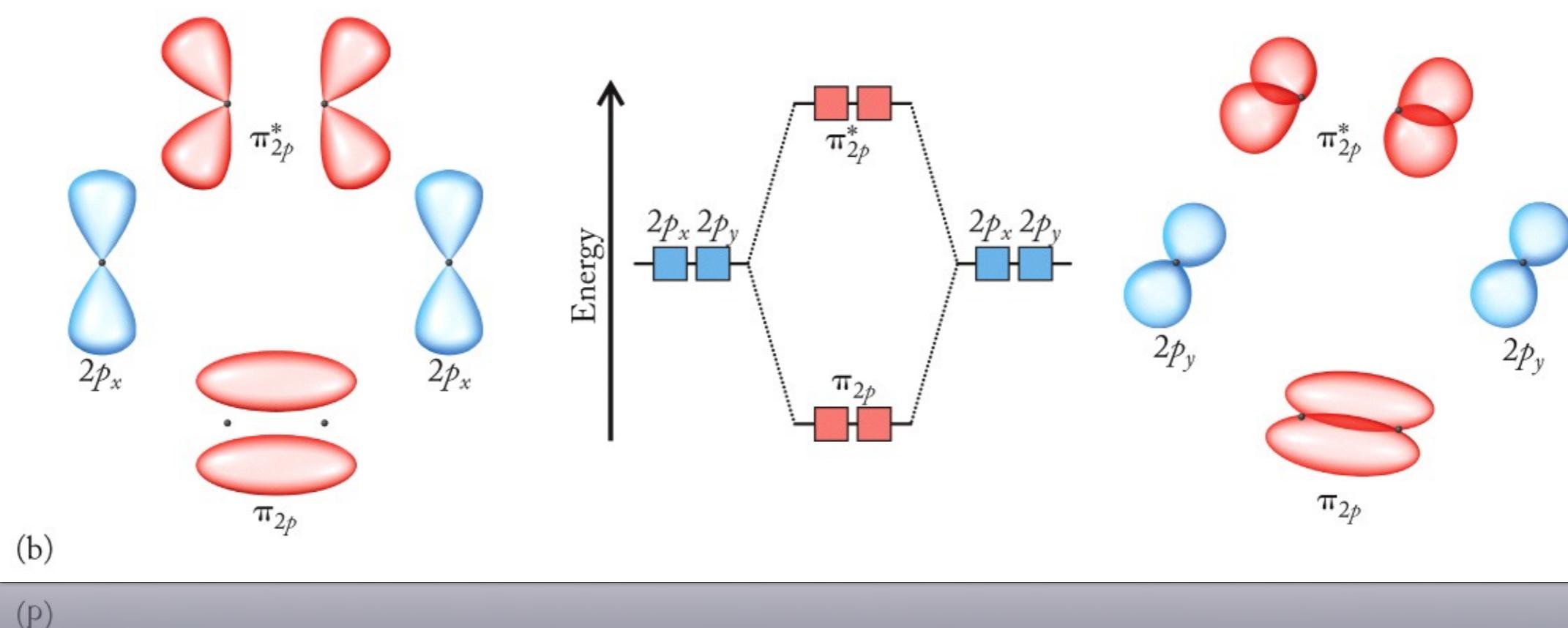
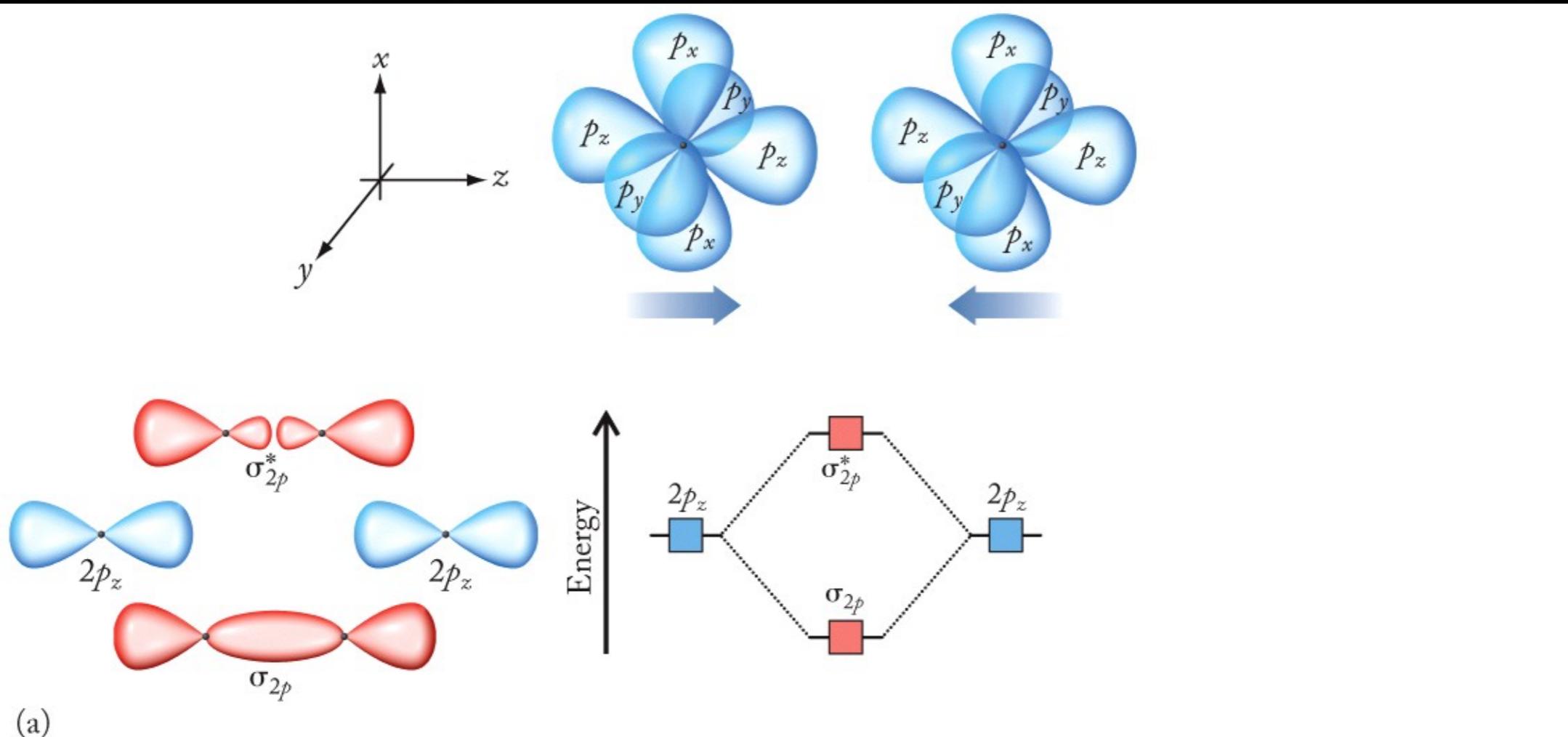


For practice

- For each of the following...
 - ...draw the MO energy diagram with labels (σ_{1s} , σ_{1s}^* , ...)
 - ...fill in with electrons
 - ...indicate bond order and whether the species would exist
- H_2^+
- H_2^-
- He_2
- He_2^+

Bonding among the 2p elements







Where did we go today?

Ch1010-A17-A03 Lecture 20

- § 6.4 Molecular orbitals

Next time...

- § 6.4, 6.5 Morelcular orbitals