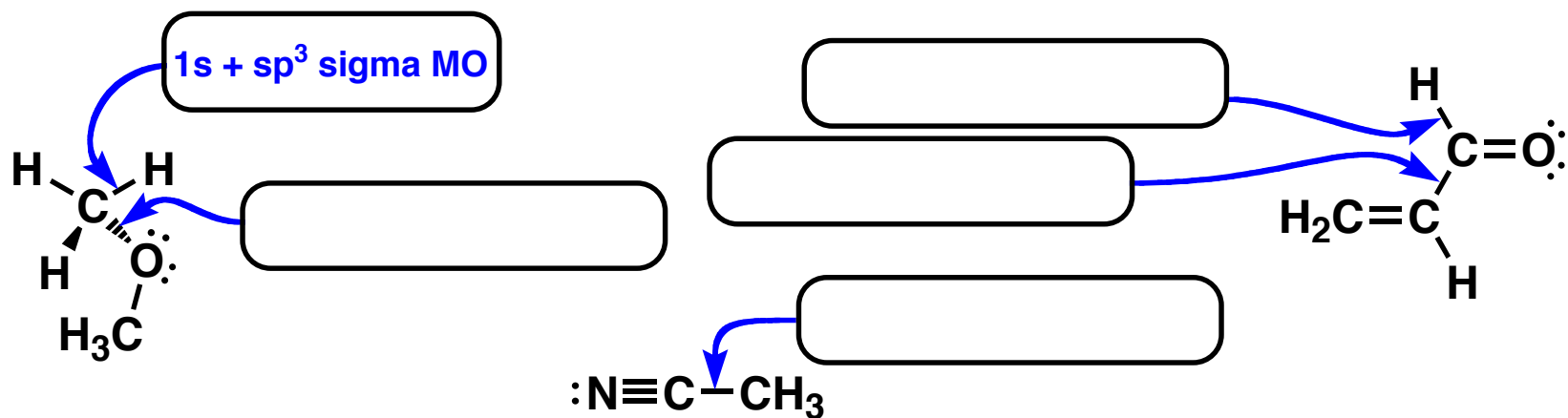


Discussion Problem

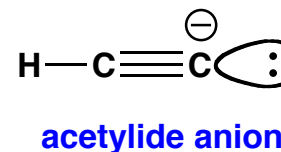
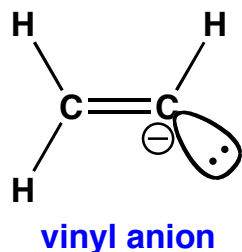
Classify the Sigma Bonds in These Molecules

In organic molecules, 2p AOs are typically used to construct pi MOs while 1s orbitals (from hydrogen) and hybrid orbitals are typically used to construct sigma MOs. Since hybrid orbitals are identified by an atom's EPDs, it is possible to determine the type of hybrid atomic orbitals for each atom by inspection of a Lewis structure. For a pair of atoms that form a covalent bond, the hybrid AOs describe the type of sigma MO involved. This idea is illustrated by the examples provided below.



Discussion Problem

Using a pair of MO energy diagrams, show why the acetylide anion is more stable (i.e., less basic) than the vinyl anion. Do not draw complete diagrams; only show the parts that are essential to answering this question. Based on what you draw, briefly explain why acetylide anion is more stable than vinyl anion.



C⁻ 2p energy level

C 2p energy level

H 1s energy level

C⁻ 2s energy level

C 2s energy level

