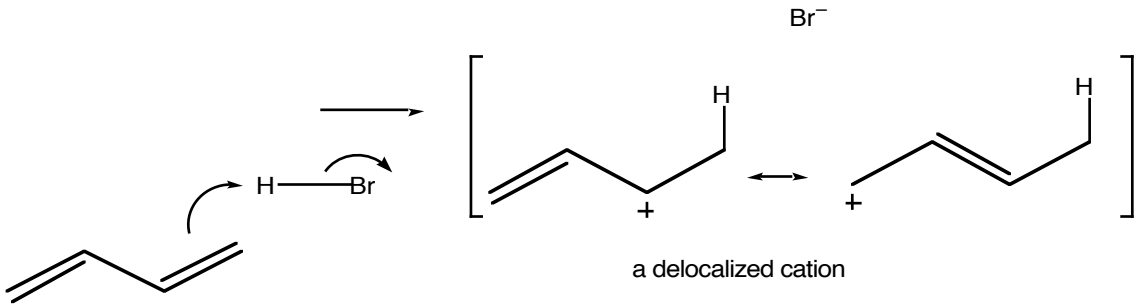
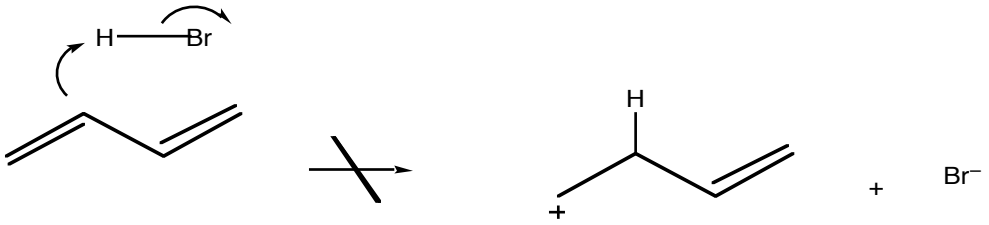
Answers to Problem 84. Chemistry 301X - 2006

The first problem is to decide in which direction butadiene will protonate. There really is no choice; one protonation leads to a resonance-stabilized carbocation, the other to localized primary carbocation.

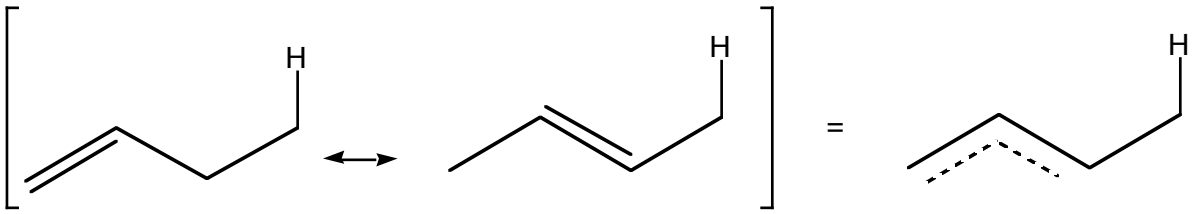


a delocalized cation

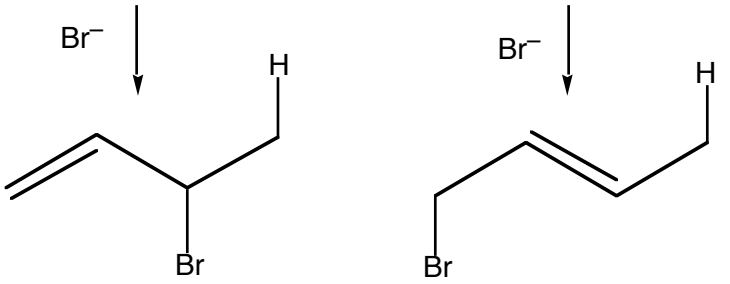


a localized, primary carbocation.
unknown!

Two carbons share the positive charge in the resonance-stabilized, allyl cation. Be careful in the drawing below not to fall into the trap of thinking of the two resonance forms as separate entities. Two carbons share the charge in a single structure, summarized at the right of the figure with the “dotted bond” structure.

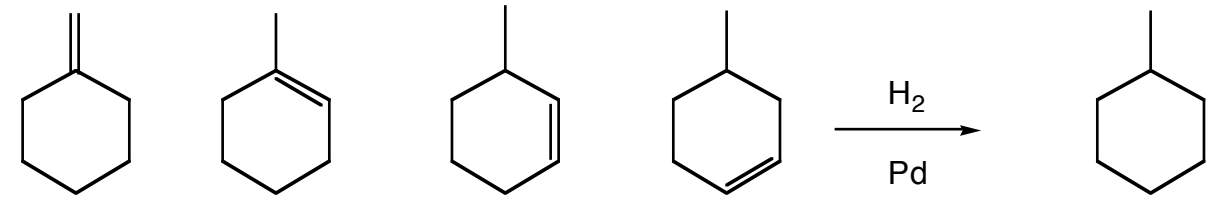


summary structure



The major product contains a disubstituted double bond (more stable) and the minor product has a monosubstituted double bonds (less stable).

There are four possible molecules that will hydrogenate to give methylcyclohexane. Only one has five ^{13}C signals:



5 signals 7 signals 7 signals 7 signals