

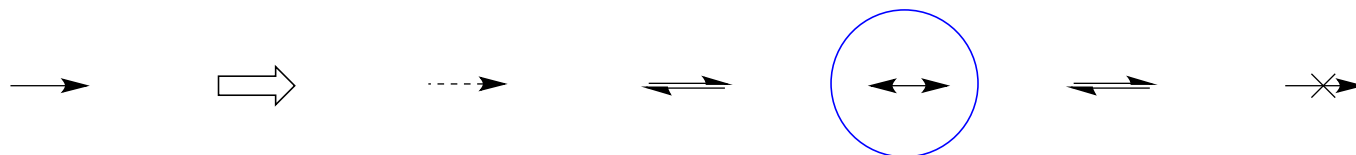
Resonance: Practicing Curly Arrows

from chapter(s) _____ in the recommended text

A. Introduction

B. Resonance

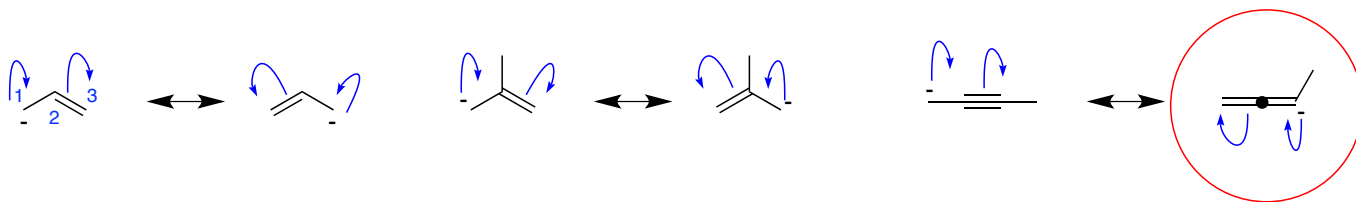
Electrons move *much faster than*



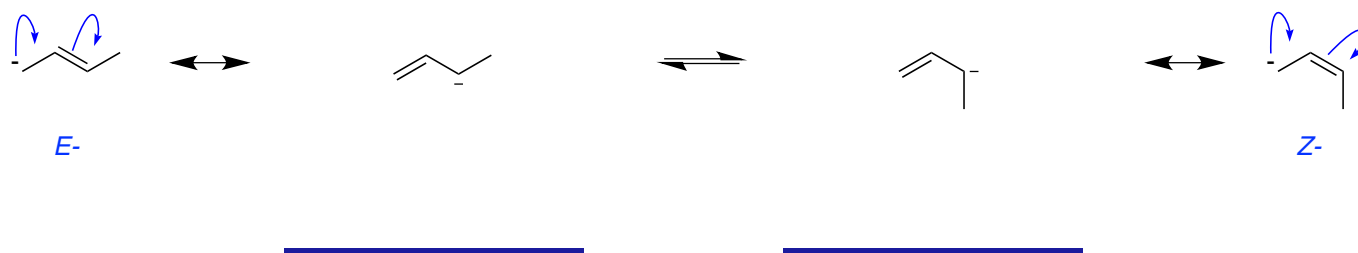
absolutely wrong to use the other descriptors shown above.

movement of *electrons*.

C. Resonance Stabilized Anions

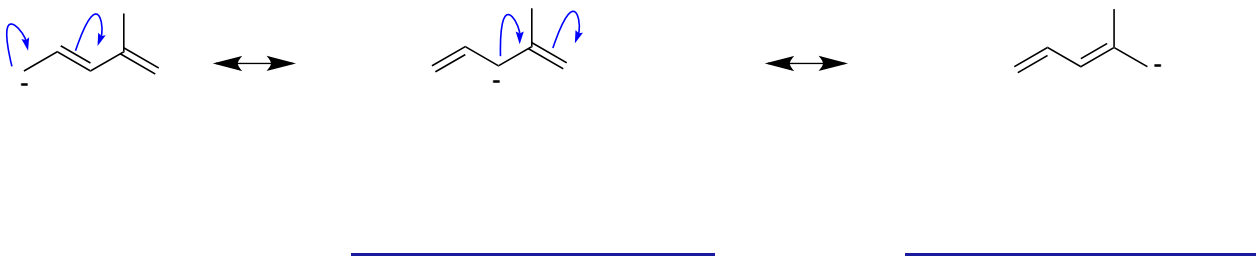
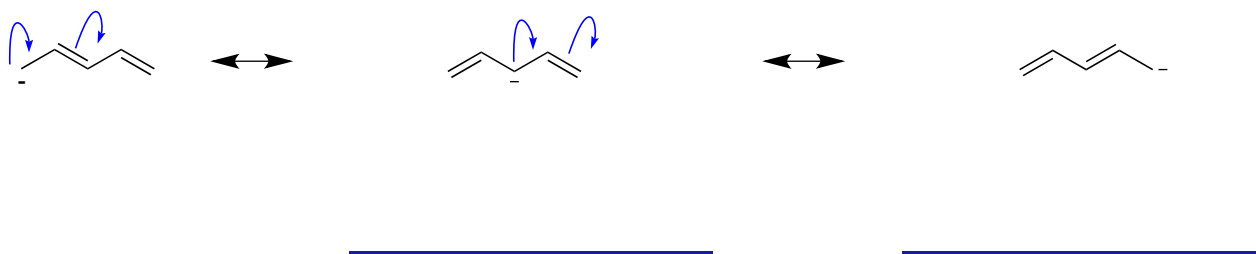


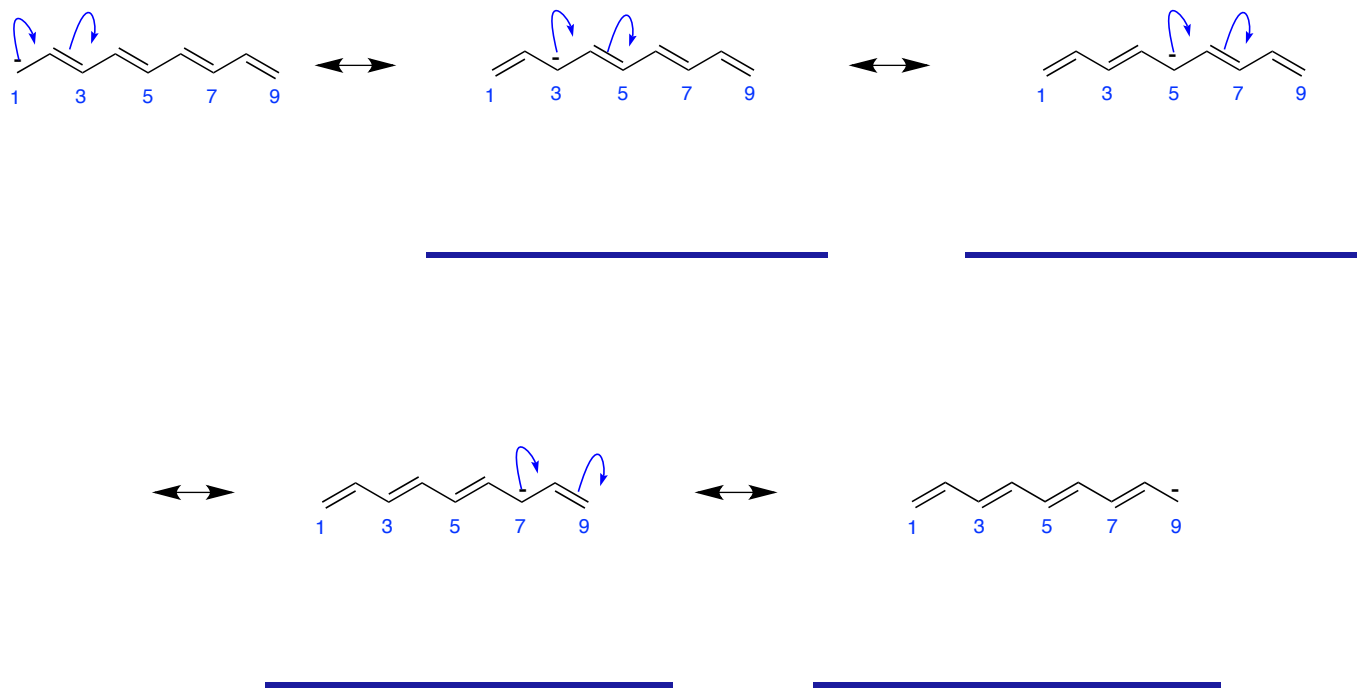
flow *does not* allow
same *is* true



is possible for *Z*-butenyl anions to equilibrate to their more stable *E*-isomers via equilibrating conformations.

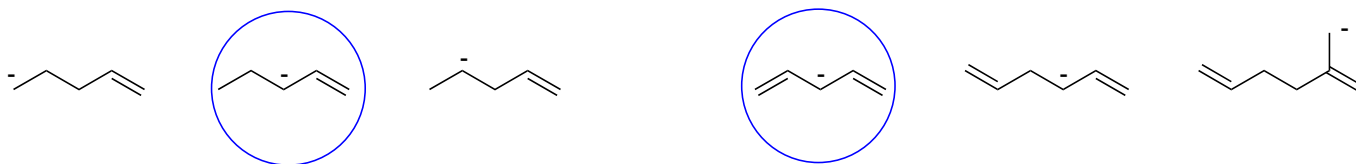
It is *possible*





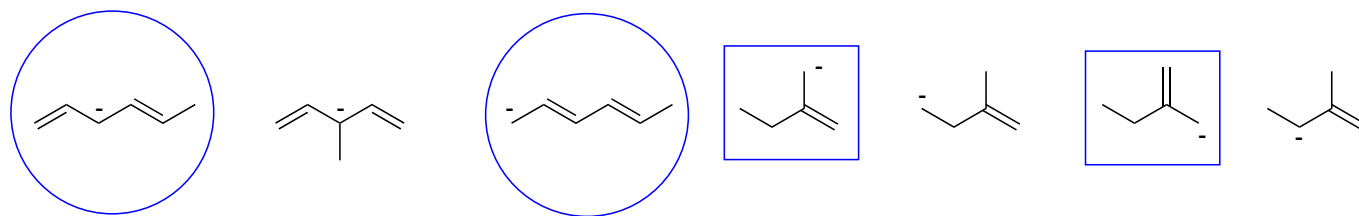
is possible for the negative charge on the nonatetraenyl anion to reside on the 1,3,5,7,9-carbon atoms. The negative charge in that anion *never* *does* appear

likely to be *more* stable

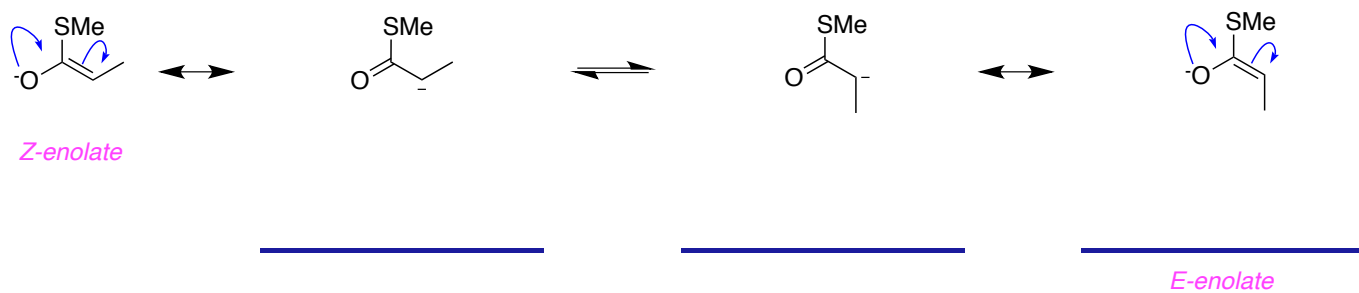
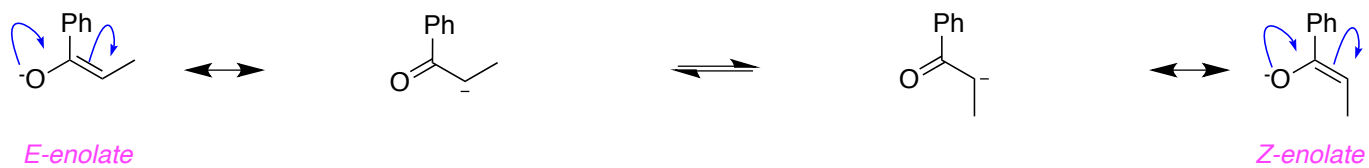
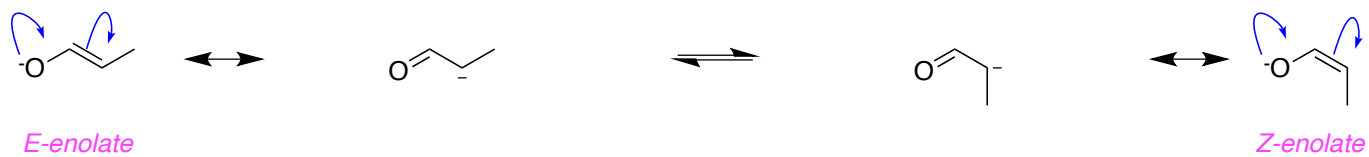


Anions that have several resonance structures are said to be *delocalized*

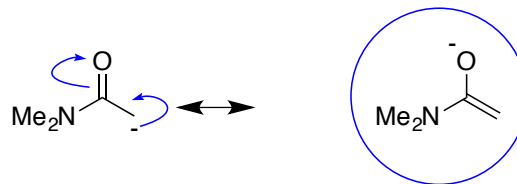
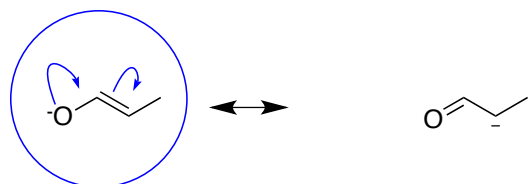
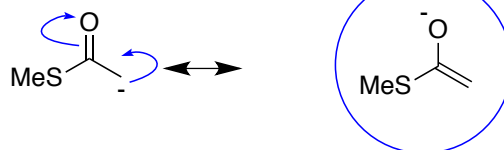
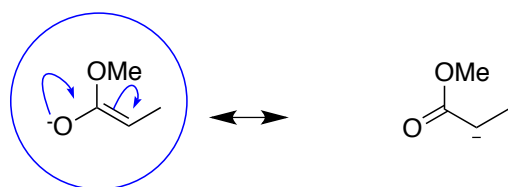
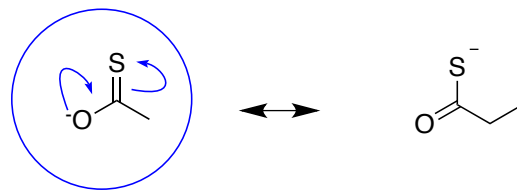
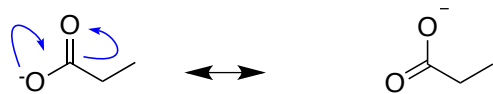
less stable

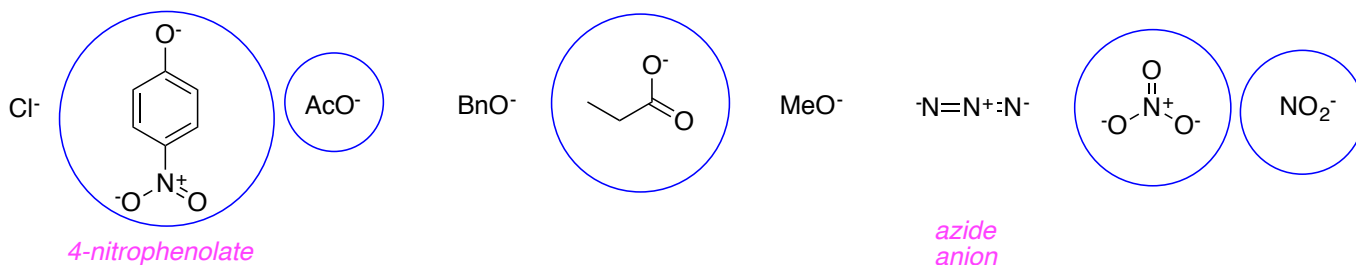
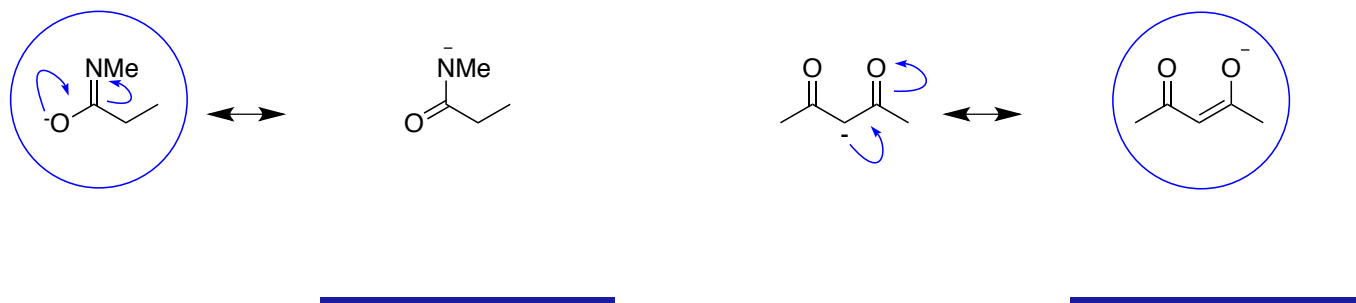


It *is* possible



most *electronegative* atom.





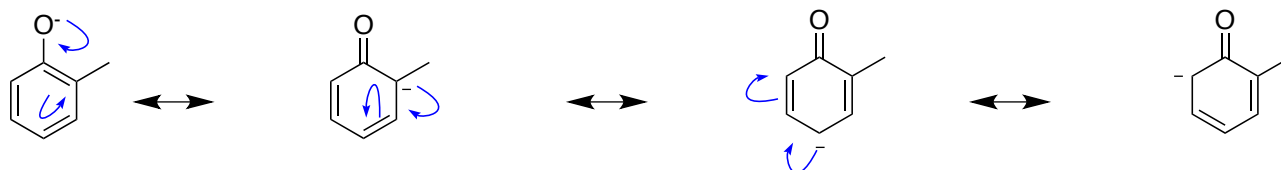
-ve charge localized on electronegative atom *many contributing resonance forms* *highly localized charge* *electron delocalization* *-ve charge localized on electropositive atom*

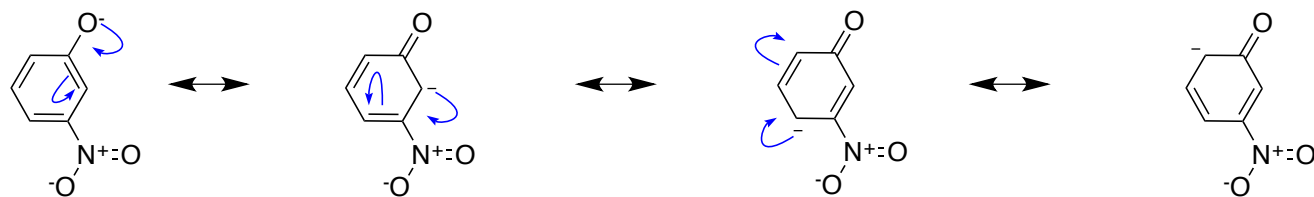
How Resonance Stabilization Of Anions Influences Acidity

product

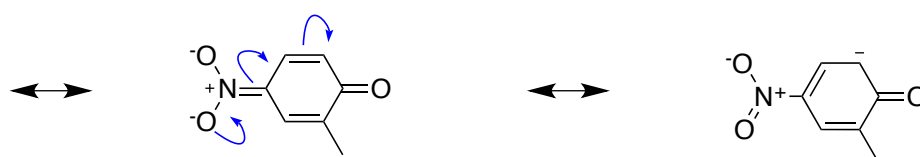
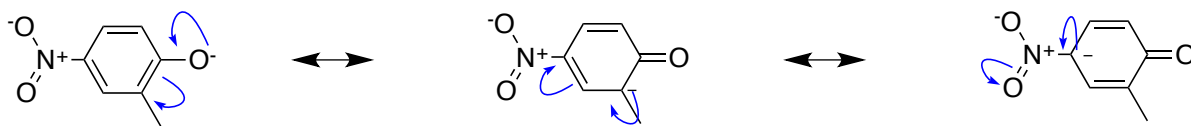


low pK_a and pH





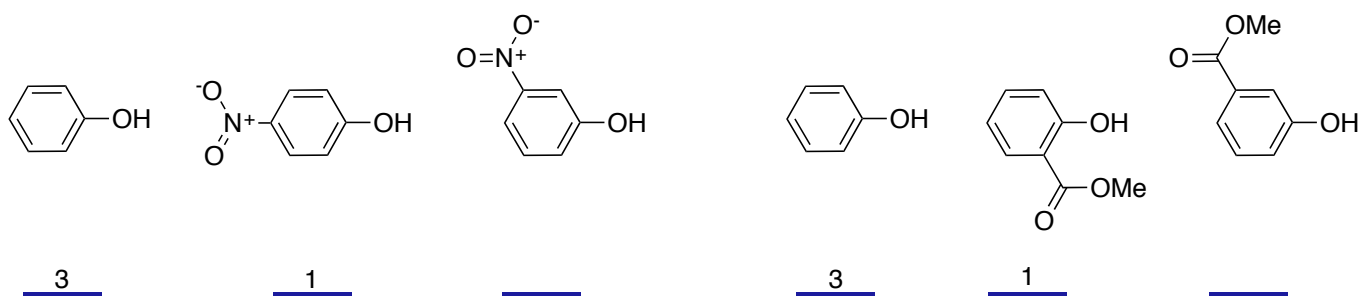
is not possible for both the O-atoms

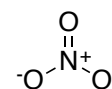
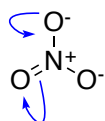
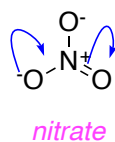
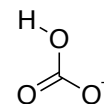
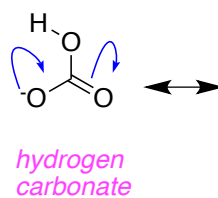
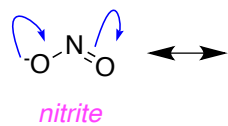


is possible for both the O-atoms

is possible for both the O-atoms of the nitro group

more stable than their 3-isomers.

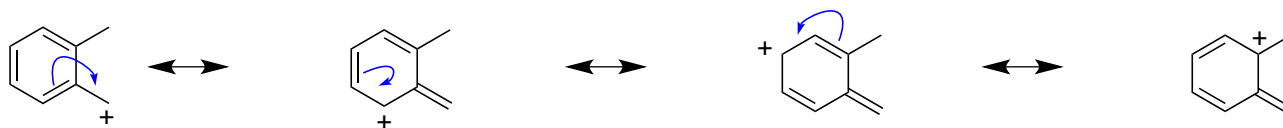
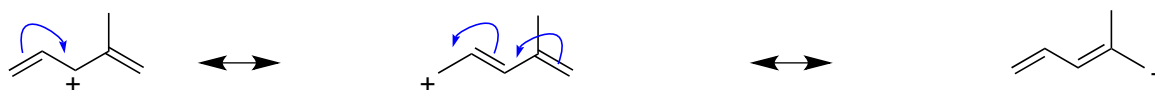
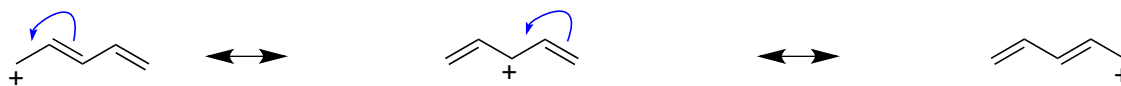


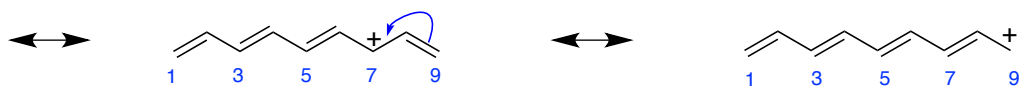
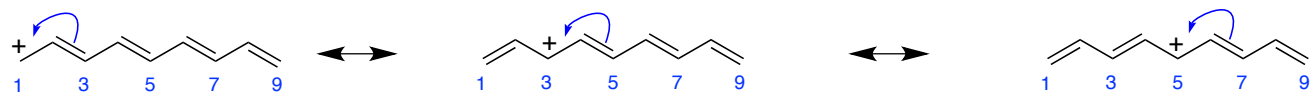


stronger acid than nitrous and carbonic acid.
in fact, HNO_3 .

D. Resonance Stabilized Cations

towards positive charges and rarely the reverse.

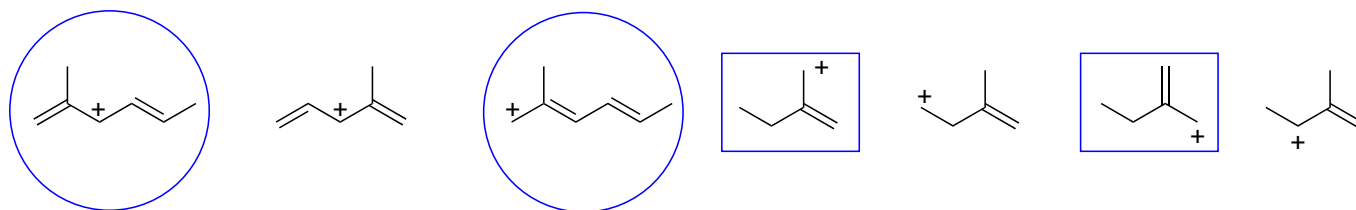




can reside on the 1,3,5,7,9-carbon atoms and it is never
does appear



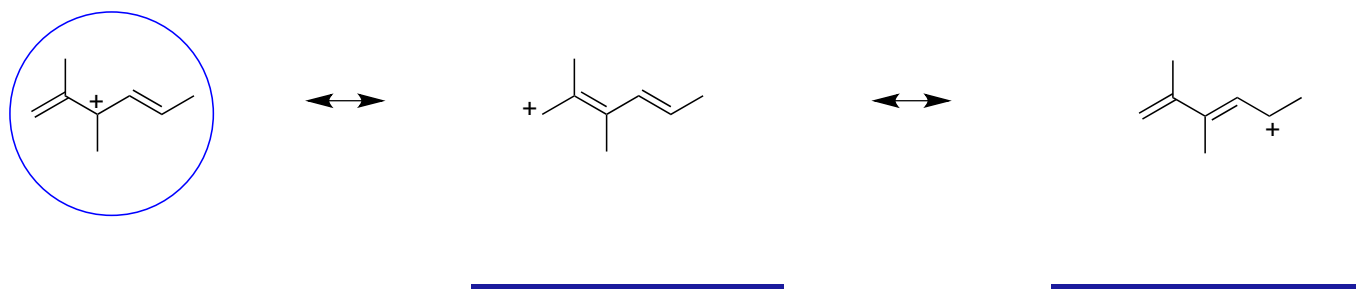
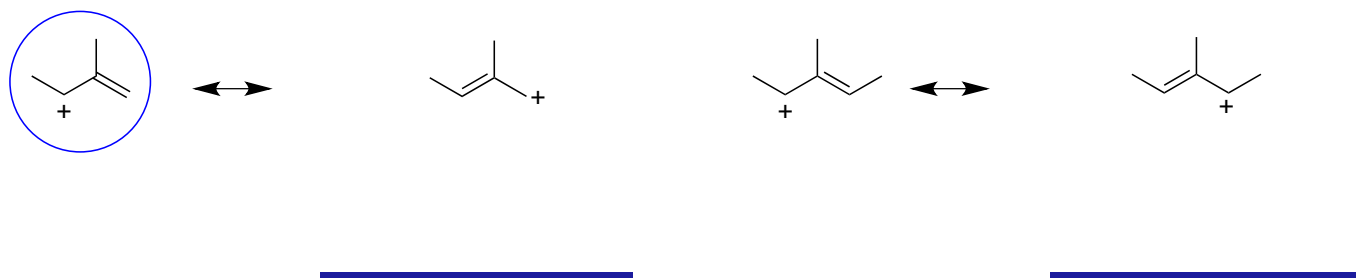
likely to be more stable
be delocalized than ones that do not.
The allyl cation is less

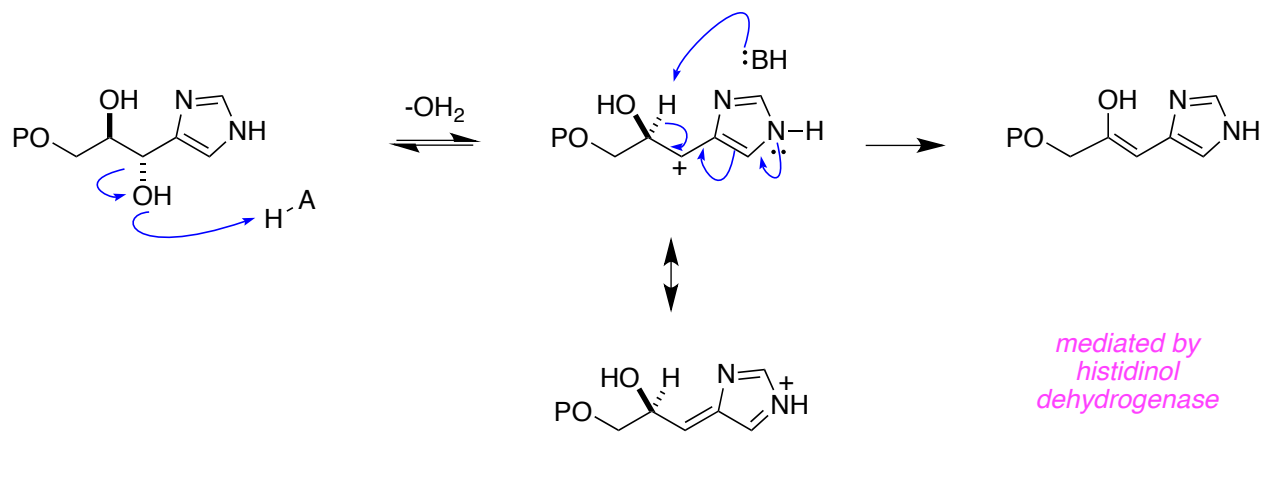


is possible for the positive charge to hop between atoms other than carbon.
most electropositive atom.

, ie carbocations, tend to be more
primary (1°).

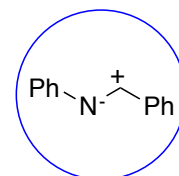
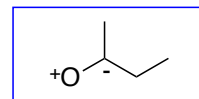
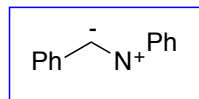
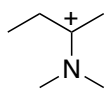
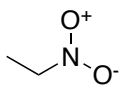
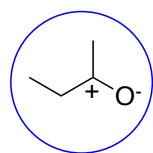
It is not possible



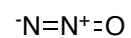
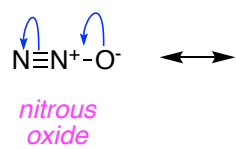
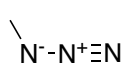
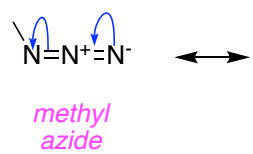
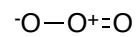
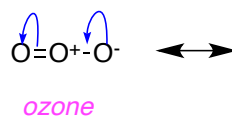
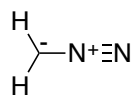
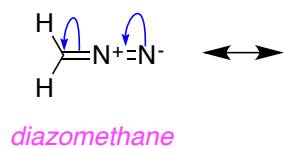


E. Resonance In Neutral Molecules

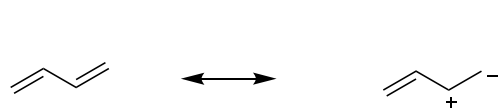
less stable



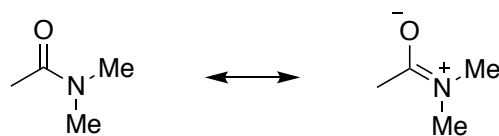
zwitterions



F. Resonance Stabilizes Some Conformations

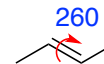
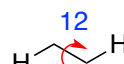
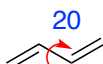
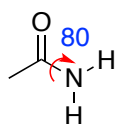
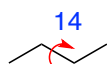


*charge separated form
less stable*



*charge separated form
more stable*

The conclusion is that rotation about the σ -bond in the amide requires more energy because resonance gives that some $C - N$ link some double bond character.



*write numbers
to indicate
approximate
maximum
energy
barriers*

choices are: 260, 80, 20, 14, 12 kJ·mol⁻¹