Curly Arrows And Electron Flow

A. Introduction

B. Electron Flow

double-headed arrow.

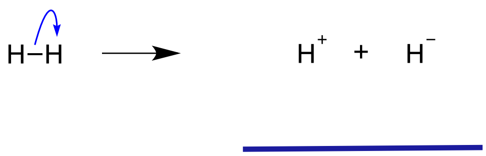
are,

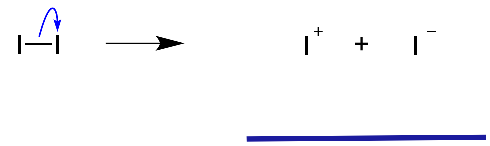
high electron density.

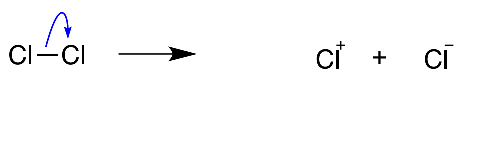
never

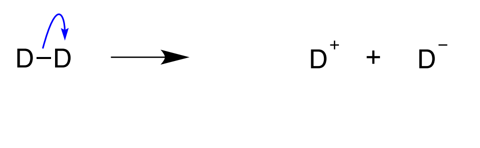
Effecting Only One Bond

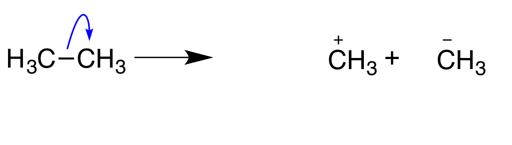
heterolytic

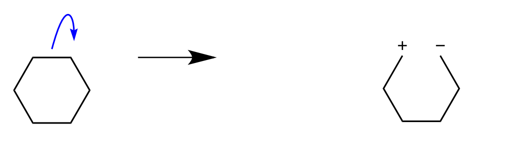












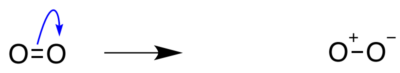
need not be

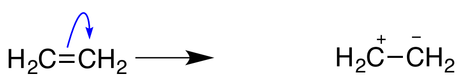
possible

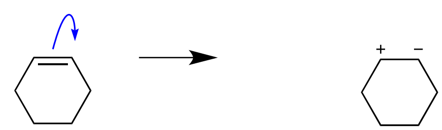
does not

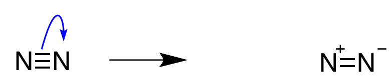
must equal the number of anions.

2 *e*; this sometimes

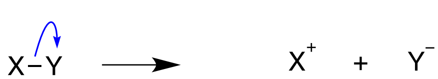








a



b

is *less*
towards Y.

pathway 1

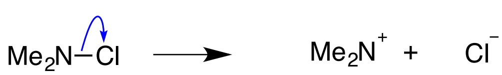
pathway 2

more favorable

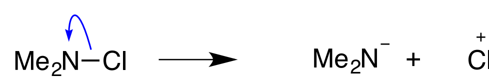
less favorable

more favorable

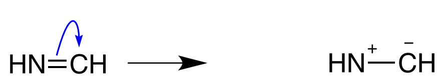
less favorable



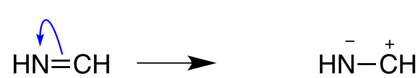
more favorable



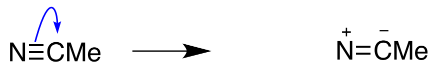
less favorable



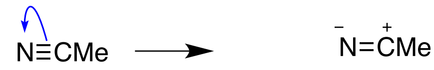
less favorable



more favorable



less favorable



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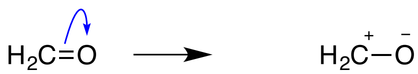
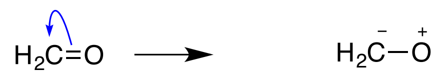


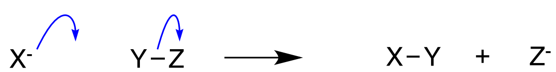
more favorable



less favorable

Effecting Two Bonds

a



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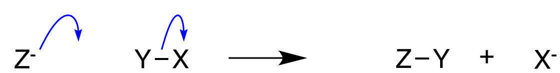
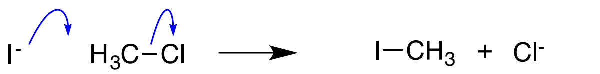
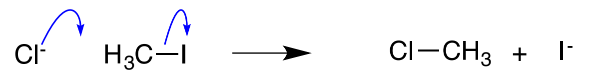


disfavored

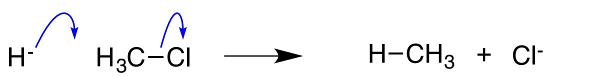
pathway 1 *pathway 2*



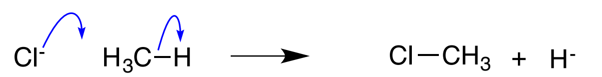
more favorable



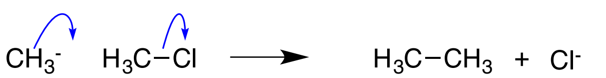
less favorable



more favorable



less favorable



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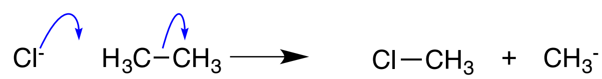
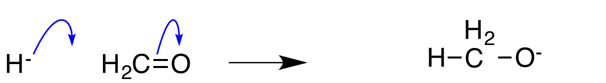


less favorable



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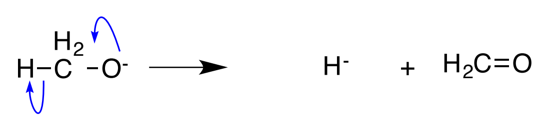
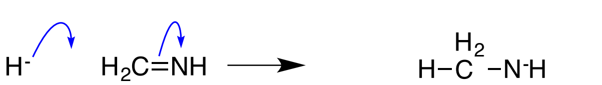
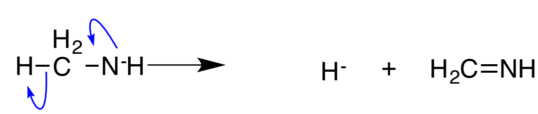


less favorable



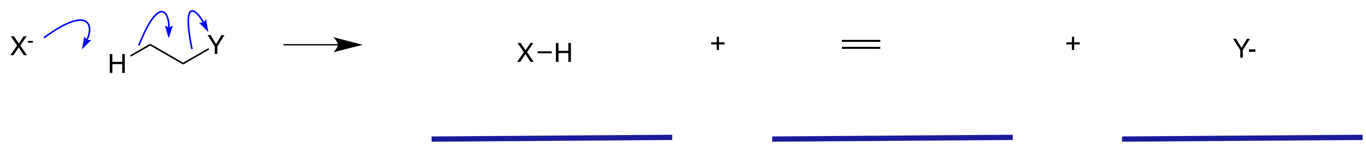
more favorable



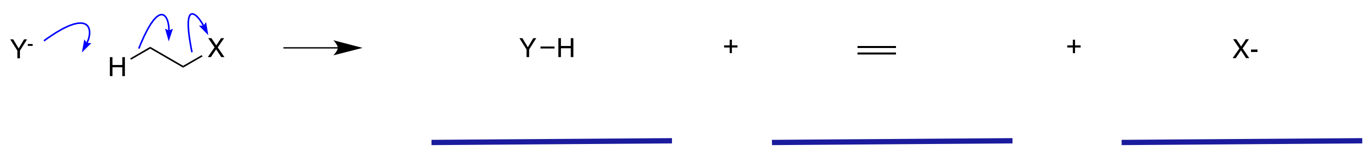
less favorable

Effecting Four Bonds

a



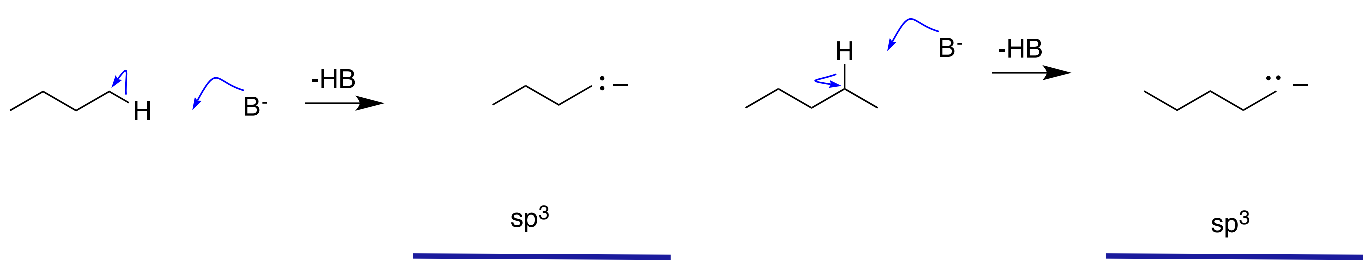
b

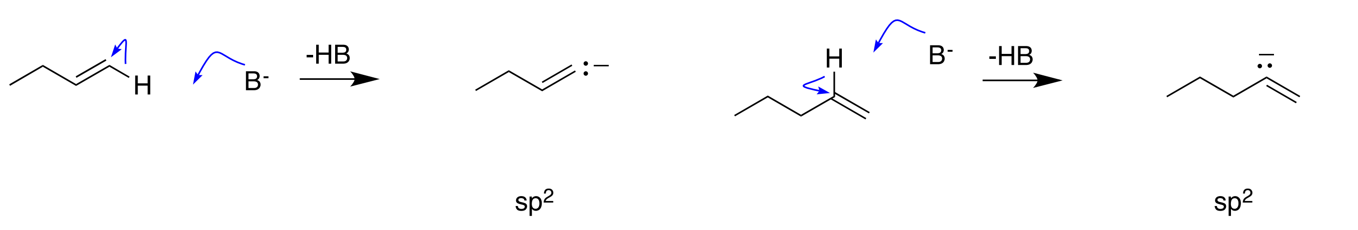


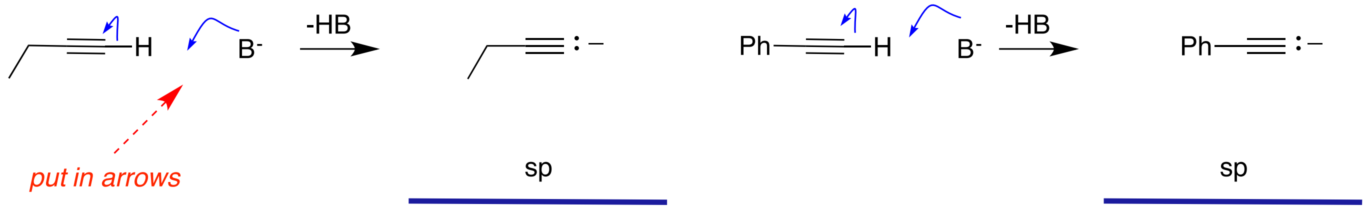
favored if X is more basic than Y

C. Representations Of Charged Hydrocarbon Scaffolds

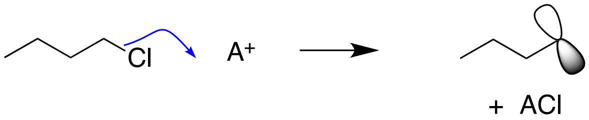
sp^3 hybridized carbon the resulting anion is *sp^3* hybridized.
electrons move *towards C* and the resulting anion is *sp^2* hybridized.
sp -Hybridized carbanions



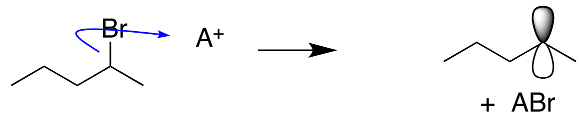




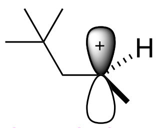
A sp^3-hybridized carbon has __4___
tend to be *sp^2* hybridized.



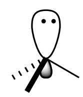
sp^2



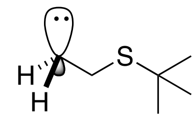
sp^2



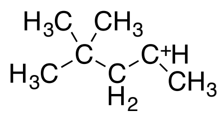
trigonal planar

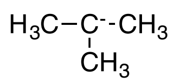


pyramidal

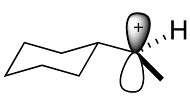


pyramidal

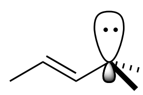




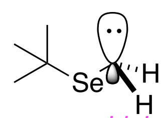
$C^-H_2CH_2SC(Me)_2CH_3$



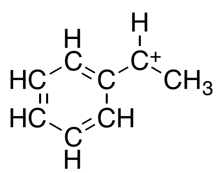
trigonal planar

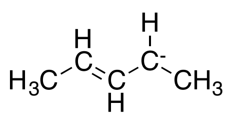


pyramidal



pyramidal



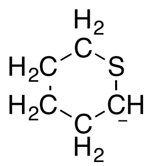
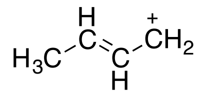
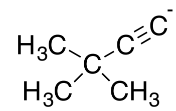


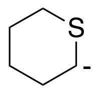
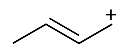
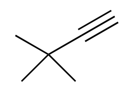
${}^tBuSeCH_2^-$

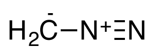
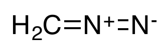
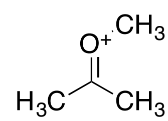
sp^2 hybridized, and carbanions C^-R_3 are *sp*^{3}-hybridized. Explain why this is so by considering the number of electrons around carbon in C^+H_3 and in C^-H_3.

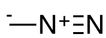
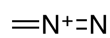
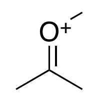
Carbon in C^+R_3 has to accommodate *three atoms* containing *six* shared electrons around it.

Carbon in C^-H_3 has to accommodate *three atoms and one lone pair* containing *eight* shared electrons around it.

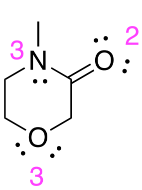
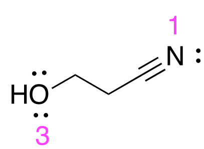
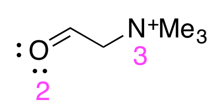




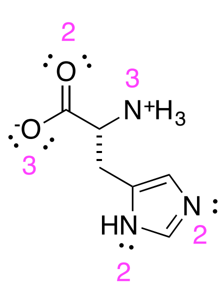
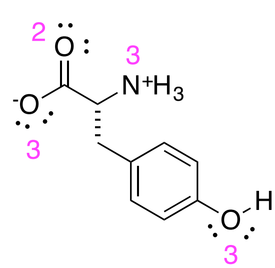




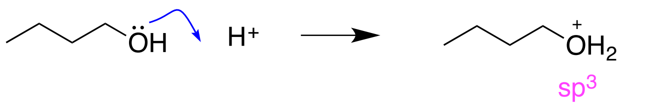
D. Heteroatoms, Lone Pairs, And Moving Electrons

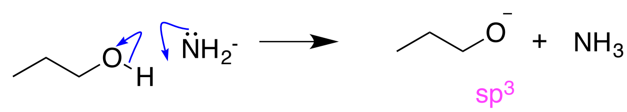




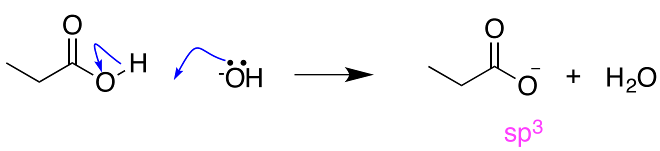



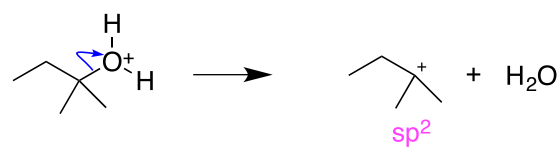
is not a change in the
gives *sp³* hybridized protonated

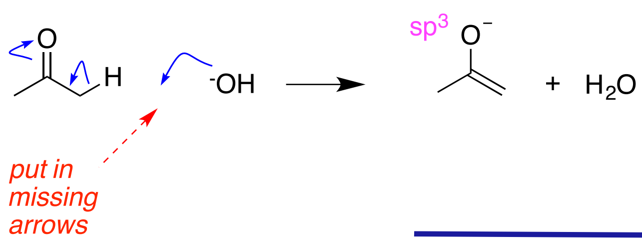
sp² hybridized protonated heteroatoms
become *sp* hybridized protonated heteroatoms.
Conversely, there *can* be

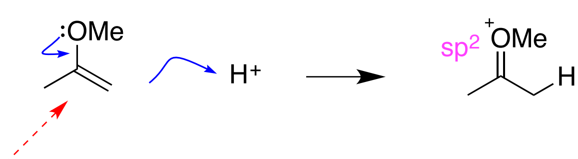


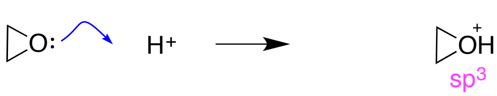


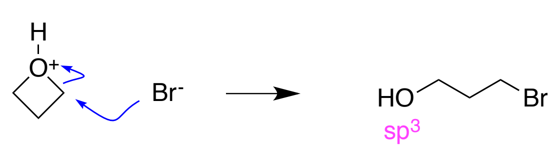




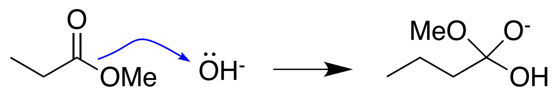


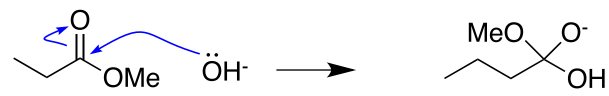


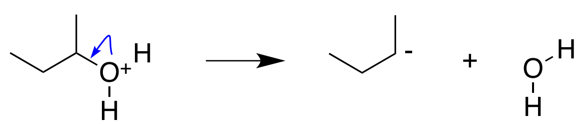


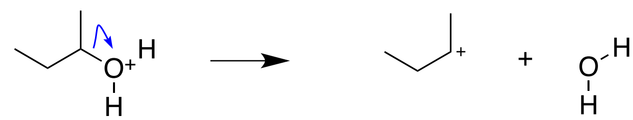


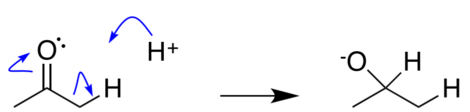
usually

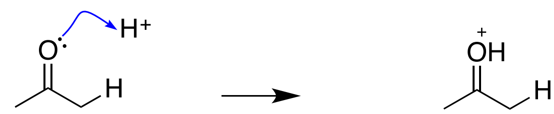












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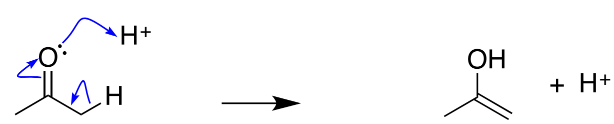
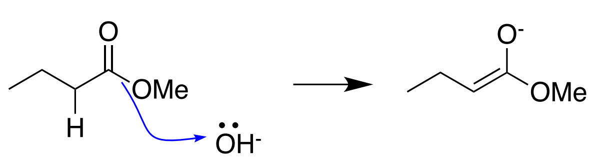
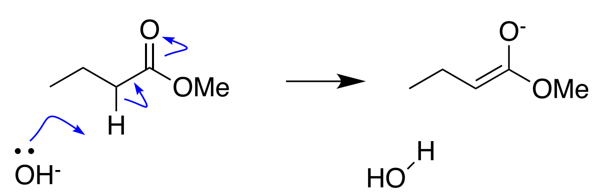
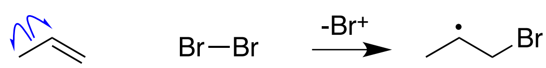
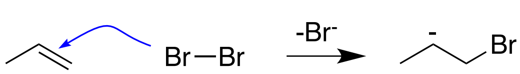
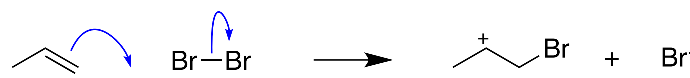




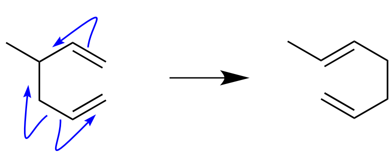




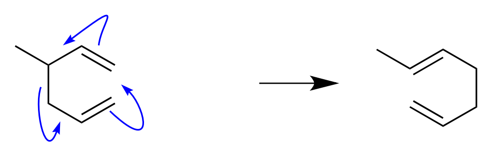




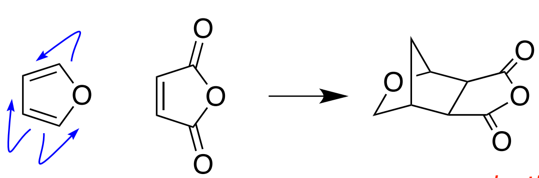
put in missing arrows



should be

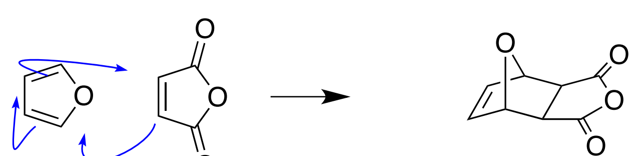


show all arrows



wrong product!

should be



show all arrows