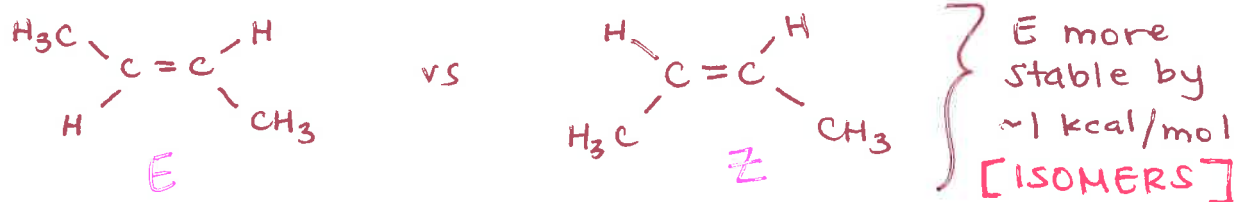


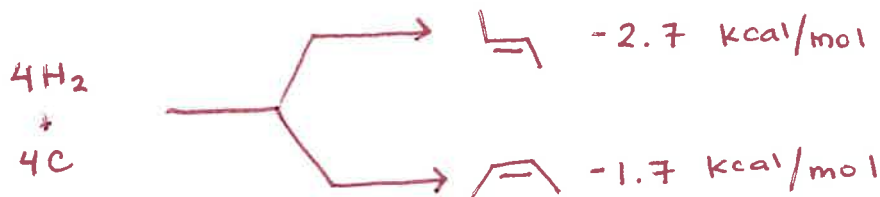
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Recall: Effect of variations in alkene structure on stability?

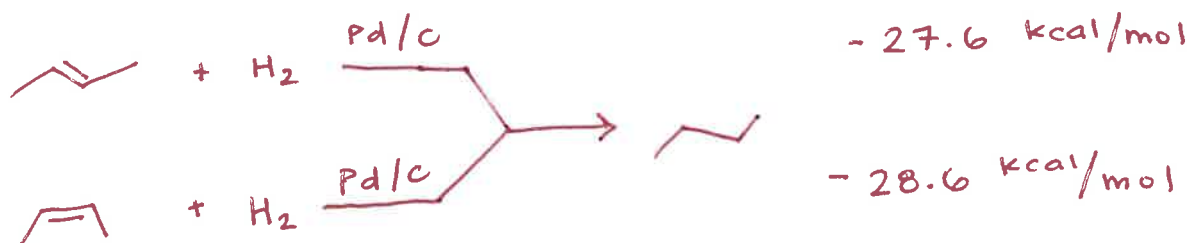
- Answering such questions involves "thermochemical comparisons" - rxn energies (must be carefully selected...)



ΔH_f° comparisons

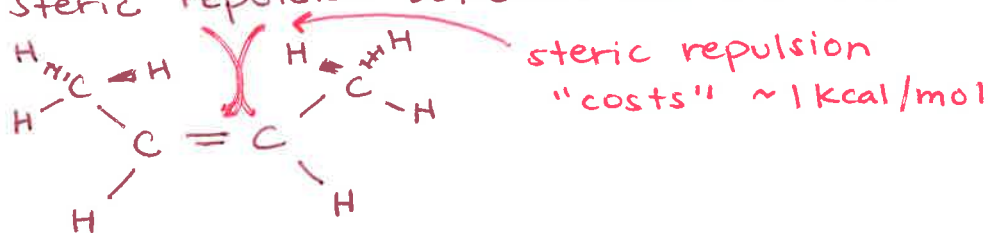


ΔH_h° comparisons



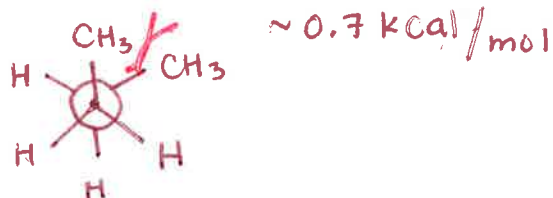
origin of this stability difference between alkene isomers?

→ steric repulsion between cis substituents



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Recall:



See text for other aspects of relationship between alkene structure & stability.

butane: gauche

• **IMPORTANT TREND** - in general, alkenes become more stable as # of alkyl groups on C=C increases

ex.



vs.



↳ more stable by $\sim 2.5 \text{ kcal/mol}$

* see text for other examples.

Addition Rxns of alkenes

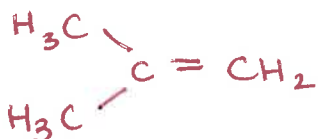
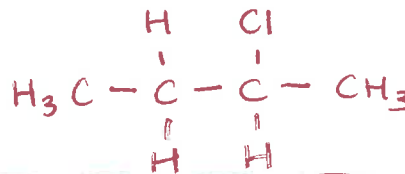
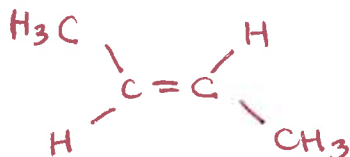
General:



* many variations!

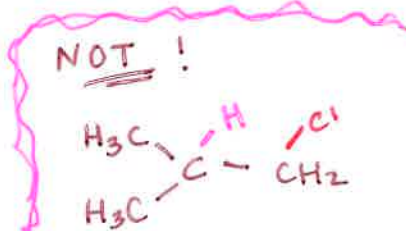
specific example: HX addition (HCl, HBr, HI) [HF - more complex]

specific case



(Note: unsymmetrical alkene)

("regioselective")



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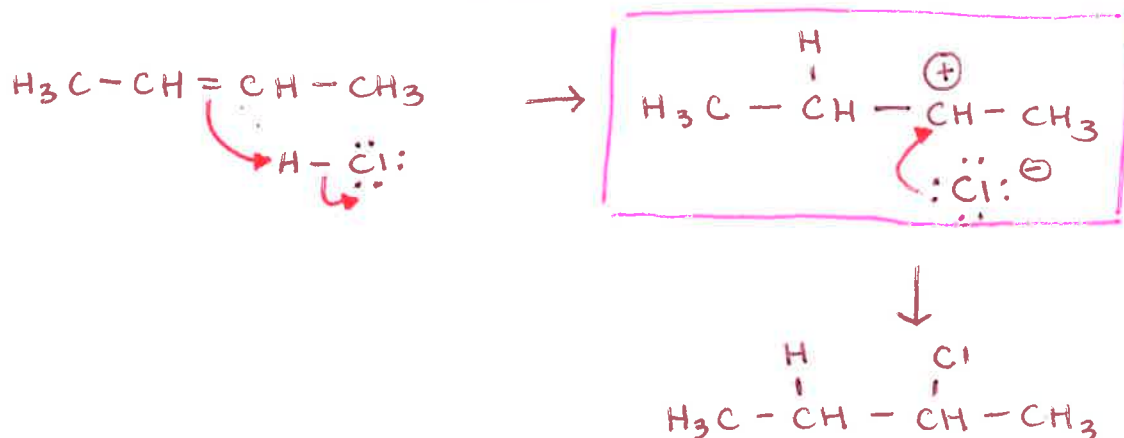
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In general, for unsymmetrical alkenes, Cl (or "X" of H-X) ends up on what was the alkene C w/more alkyl substituents.
 ⇒ ("Markovnikov's rule")

Why? ⇒ what is the mechanism of this reaction?

Mechanisms of reactions ⇒ ALWAYS A HYPOTHESIS

Mech for HCl addn to alkene:



Comments :

① 2 steps ∴ "intermediate"

↳ this type of intermediate is a "carbocation"

↳ "reactive intermediate" - unstable

Note connections

step 1 - Brønsted acid-base rxn

step 2 - Lewis acid-base rxn

Note:

