

CHEM 6352 Organic Reactions & Synthesis

Common Mistakes on Homeworks and Tests

The following (in no particular order) are common mistakes that will make you lose points on a test and receive comments on your homework. Practice avoiding them when you do your homework and they won't be a problem on the tests!

Note: I often make the following comments. This is what they mean.

- Wrong:** This is incorrect. Look up the correct answer or listen for it in the problem session.
- Show Details:** Usually show all the mechanistic steps or the rationale for the stereochemistry.
- How?:** Similar to above. Demonstrate WHY what you propose would occur. Push arrows.
- No shortcuts:** Don't skip steps. It is giving you the wrong answer.
- Stereo?:** What is the stereochemistry at this position?
- Why?:** Why is this stereocenter formed with this stereochemistry?

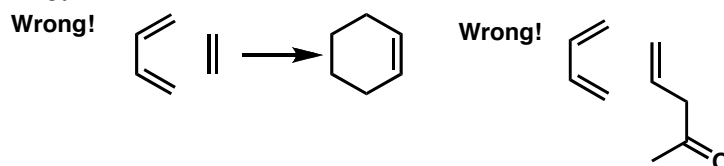
(A) Don't draw out structures or count carbons

This results in "bookkeeping" errors: atom valence, formal charges, side reactions, incompatible functional groups, etc.

(B) Cations as mechanistic intermediates in basic conditions or anions as intermediates in acidic conditions.

These intermediates are too unlikely under those conditions to be rational.

(C) An intermolecular Diels-Alder reaction without electronic activation on either the diene or dienophile.



(D) Illegible Writing or answer problems out of order in final draft

If I can't read it, you won't get points. Proofread!

(E) Attempt only one retrosynthesis for a given target

Usually multiple retrosyntheses are required to design an effective synthesis. Some trial and error is routine, but your skill will increase as you practice. It is thus VERY IMPORTANT you try several retrosyntheses for each synthesis target in the homework to learn to do it quickly.

(F) Don't answer the question that was asked

The best way to avoid this mistake is to reread the question instructions after you have answered the question. Be sure that your answer provides ALL of the requested information.

(G) Don't have complete answer

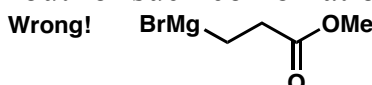
If you work with others on the homework, be sure you have and understand all parts of the question and the answer. Show every step of a mechanism and provide any mechanism requested.

(H) Grignard reagents added to esters to give ketones

It doesn't work; it gives 3° alcohols. Draw the mechanism for yourself.

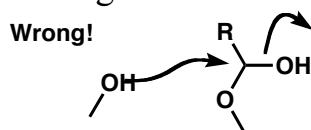
(I) Have a strong nucleophile and electrophile in the same compound

You cannot have a Grignard reagent on the same molecule as an ester or hydroxyl! One will react with the other. Watch out for such combinations.



(J) S_N2 reactions on acetals, alcohols, or hindered electrophiles

They do NOT go through an S_N2 mechanism! Review substitution chemistry and carbonyl chemistry from sophomore organic. See also Grossman's book.



(K) Drawing a proton transfer via a 4-atom transition state instead of an intermolecular proton transfer.

This is sloppy and will cost you points.

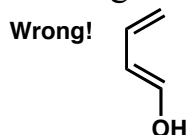


(L) Don't show stereochemistry

Always show relative and absolute stereochemistry and the rationale of why that stereochemistry is produced unless it cannot be known.

(K) Show the enol tautomer as the stable form of a carbonyl

Review carbonyl chemistry. Keto forms are generally (but not always) more stable.



(L) S_N2 Reaction at an sp² center

Vinyl halides are not electrophilic!

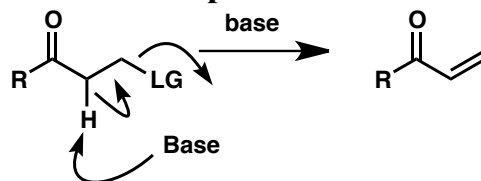
(M) Inadvertently changing stereochemistry

Trans to *cis* double bond geometry or *R* to *S* stereocenters occur when intermediates are redrawn.

(N) Bond formation between two electron-rich or two electron-poor carbons

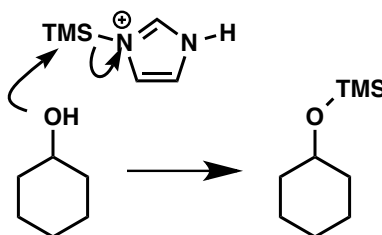
(e.g., using mCPBA to epoxidize an enone)

(O) Unintentionally using intermediates prone to β -elimination.



(P) Not showing every proton transfer in a mechanism

Wrong:



Correct:

