

**CHEM 247A Synthesis Report -- Due Tuesday, Dec. 20, 2022 (at the final exam)**

**READ THESE INSTRUCTIONS CAREFULLY**

Work alone or with a partner to complete this assignment.  
If working with a partner, you must also meet with me (by zoom)  
and convince me that both of you contributed and understand the article.

**50 points. For full credit, be sure to convince me if you use acronyms such as DMF or DME or THF, that you know what you are talking about with a structure or name.**

Do not wait until the last minute to do this assignment. Read these instructions NOW so that you have an idea of what is involved. This assignment is a significant part of your grade (about 2%).

*Total synthesis* ([http://en.wikipedia.org/wiki/Total\\_synthesis](http://en.wikipedia.org/wiki/Total_synthesis)) is the development of a practical laboratory route from simple “readily available” materials to a generally quite complex organic compound, usually of medicinal interest. It is one of the most challenging (and, to some of us, interesting!) areas of research in chemistry because it demands and develops in the researcher a broad range of knowledge of organic chemistry and provides exposure to a wide range of laboratory skills and procedures. Researchers doing total synthesis are often pushing the frontiers of organic chemistry, trying to figure out a new way to do reactions to make compounds that have never been made before. A PhD in the area of total synthesis is often the starting point for a career in [medicinal chemistry](#).

Your job in this assignment is to find one article specifically from *The Journal of Organic Chemistry* or *The Journal of the American Chemical Society* or *Organic Letters* **published between June 2022 and December 2022** that **includes in its title the phrase “Total Synthesis.”** (No other journals, please, without my permission.) I recommend going directly to these journals’ web sites and searching there. Other options include Google, Web of Knowledge, and SciFinder Scholar. Always retrieve the PDF version, not the HTML version, if possible. Send me the article as an attachment to an email message or send me a link to the web page for that article so I can clear it. I may say no – it may not suit our needs, or it may be claimed already. The rule will be first-come, first-served, and no two groups with the same article. If I approve, add the article to your CHEM 247 portfolio. Almost certainly you will need to come in anyway and talk with me about the paper. These are not trivial to read. The sooner you can clear this with me, the better!

**Turn in this assignment as a Google Doc in your CHEM 247 portfolio.** Feel free to past screen clips of figures in the article into your document wherever you feel that would be useful. Also include in your portfolio the “supporting information” PDF document for this paper, if there is one. This will include spectra and, most importantly, experimental details. Answer the following questions.

1. (2 pts) What is the full DOI (*document object identifier*) URL for this paper?
2. (2 pts) How did you find this paper?
3. (2 pts) Why did you choose this particular paper?
4. (2 pts) Who are the authors? Where (at what university or company) was the work done?

5. (2 pts) What was their reason for carrying out this synthesis? (Was the target compound of some medicinal value? Was it of theoretical interest? What do they say in their introduction?)
6. (2 x 20 pts) Identify **two reactions discussed this semester** that were used in this synthesis. See if you can find, for example,  $S_N2$  reactions or E2 reactions that were part of the synthesis and discuss them. Alkene reactions, oxidations, and reductions are also appropriate, as we will be discussing those soon. In each case:
  - a. Highlight the reaction both in the graphic “scheme” and in the text discussion that mentions it.
  - b. Identify its mechanism if it is one that we learned.
  - c. What sort of reactant—alkyl halide, tosylate, alcohol, primary, secondary, tertiary, etc.—was involved?
  - d. What sort of product was formed?
  - e. Were there regiochemical or stereochemical issues? What does the author say about these? What do you know from this course about these?
  - f. Find the experimental section of the paper to answer the questions below. In most cases, this is in a separate PDF document called the *Supporting Information*. Indicate what page of that document refers to the reaction you are discussing. Discuss what conditions were used:
    - i. What was the solvent?
    - ii. Was the solvent protic or aprotic?
    - iii. What reagents were involved?
    - iv. Were the conditions acidic, basic, or neutral?
    - v. Was heating or cooling applied? If so, why do you think?
    - vi. What was the yield? Enantiomeric excess (if appropriate)?
    - vii. Why (do you think or do they say) were these conditions used?

5 pt bonus: Explain the  $^1\text{H-NMR}$  spectrum for one of the products of the reaction you discussed.

**You do not have to do this as though it were an exam. It is not. I expect to consult with you.**

I love to read these articles, and so I encourage you to meet with me to talk about your article. Don't worry if you don't understand much of what is in the paper. I will help you. We have only scratched the surface of organic chemistry, of course. The goal is just to find *something* that we have learned this semester in there and to show me what you have learned.