

Chem 228 FS/2013  
Ethylene Ketal Protecting Group: Library Assignment  
(due 10/16/13)

Name \_\_\_\_\_

StdntNo \_\_\_\_\_

**Attach this Sheet to Your Search Results**

The following searches are to locate needed information about compounds involved in your synthesis project and to familiarize you with some of the standard reference sources for organic compound information.

1. Procedures-Download the following articles from the Journal of Chemical Education website:  
Paulson, et al., JChemEd, 50(3), 216-17 1973. –original lab (basis for procedure)  
Alber, et al., JChemEd, 88(1), 82-85 2011 –modified & improved procedure (we are doing this)  
Print out and attach procedure. Keep a copy for yourself.
2. Background-the following sources provide some background for the reactions above.  
Solomons, 10<sup>th</sup> ed refers to the current organic textbook for 221/223.  
  
Ketals: Solomons, 10<sup>th</sup> ed, pp. 681-682  
Grignard reaction: Solomons, 10<sup>th</sup> ed, pp. 808  
Alcohol dehydration: Solomons, 10<sup>th</sup> ed, pp. 935-936, 941-942
3. MSDS info-for Ethyl levulinate, ethylene glycol and other reagents and solvents used.  
You will need MWt, MP, BP, structures, CAS# for all reagents and products.  
Also IR, H-NMR spectra for each product.

Recommended sources: Synth Project FS13 web link, SDBS, Merck Index, SciFinder.  
Handbook of Data on Organic Compounds, MST **reference** QD257.7.H36  
Dictionary of Organic Compounds, MST **reference** QD246.D5

4. Summary of reactions:  
  
step 1            Ethyl Levulinate is converted to Ethylene Ketal  
step 2            Ethylene Ketal is reacted with Phenyl Magnesium Bromide (Grignard rxn.)  
step 3            Ketal is removed and alcohol dehydrated to form final product

Attach your balanced reactions to this sheet and keep another copy for yourself.

**Next Week In Lab: We will begin the first step of the synthesis on 10/16/13.**

Expect a quiz over step 1. Gloves are recommended for all steps.

**You should come prepared to do step 1 of the procedure.**

Adjust amounts in JChemEd procedure to use ~0.11 mole of Ethyl Levulinate. Also, we will use hexane instead of toluene to azeotrope off the water formed in the 1<sup>st</sup> step.

Calculate the theoretical amount of water formed in the first reaction.

You should also have the usual prelab property table prepared in your lab book and an MSDS form covering all chemicals to be used in the first step.

NOTE: Xerox machines and KIC scanner on the first floor of the library can scan documents to pdf which can be stored on a thumb drive allowing free copying of reference materials.