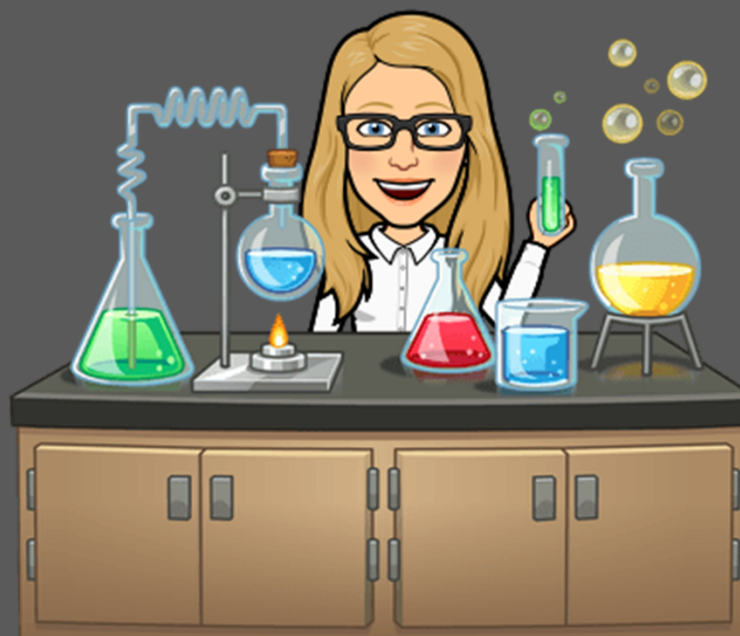


For clicker question voting, go to:
<https://pollev.com/lauriestarke263>



Dr. Laurie S. Starkey
Cal Poly Pomona

CHM 3150 Organic Chemistry II
9/25/25

Today's Topic: Wittig Reaction & Formation of Acetals (Chapter 19, Part 2)

Chapter 19

✓ Watch

✓ Read

✓ Practice

Step 2

Read

- Read Klein 19.6 **Reaction with Carbon Nucleophiles**
- Work through **SkillBuilder 19.2** and **Conceptual Checkpoint 19.15ab**

- Read Klein 19.7 **Reactions with Oxygen Nucleophiles** (hold off on Protecting Groups until later)
- Work through **SkillBuilder 19.3** and **Conceptual Checkpoints 19.20ab, 19.21, 19.22.**
- *Note: for more sugar examples, see SkillBuilder 24.1 and Chapter 24 problems 24.9, 24.10, 24.11.*

- Read Klein 19.9 **Hydrolysis of Acetals**

- [Part 2a - Wittig](#)

13 minutes

skeleton notes pages 19-4 to 19-5

- [Part 2b - Acetal Formation](#)

29 minutes

skeleton notes pages 19-5 to 19-7

- [Part 2c - Acetal Hydrolysis](#)

10 minutes

skeleton notes page 19-7

Practice

Watch

Flipped Lectures: Wittig Reaction & Formation of Acetals

Reaction with Oxygen Nu:

Addition of H₂O

Exception: Formaldehyde is 99% Hydrate in H₂O Solution

Exception: Hydrate is Favored if Partial Positive Near Carbonyl

Reaction with Oxygen Nu:

Addition of ROH

TsOH: Tonic Acid

Addition of ROH Cont.

Example

Predict

Mechanism

Mechanism for Acetal Formation

Mechanism for Acetal Formation

What is a CTI?

Tetrahedral Intermediate

Charged Tetrahedral Intermediate

CTI: Acid-cat

CTI: Base-cat

Acetals & Cyclic Acetals

Overall

Cyclic Acetals

Oxygen Nu: Acetals

Wittig Reaction

Wittig Reaction: A Resonance-Stabilized Carbanion (Nu:)

Wittig Reaction: Mechanism

Preparation of Wittig Reagent

Two Steps From RX

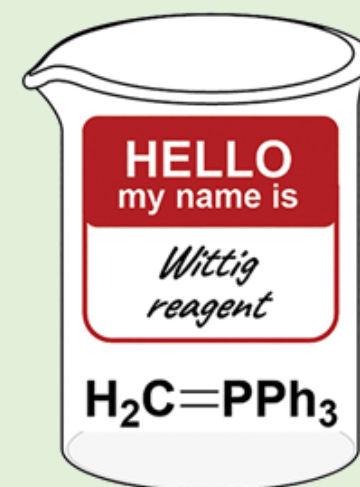
Example: Predict

Wittig Retrosynthesis

Wittig Retrosynthesis

Synthesis

Wittig Rxn

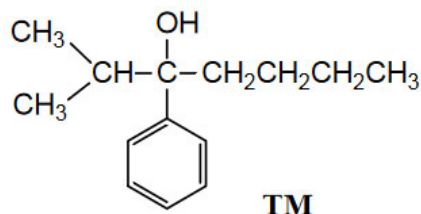


Ch. 19 Free Red Ink Homework x2

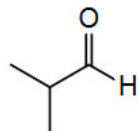
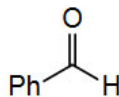
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Organic Chemistry II, CHM 3150, Dr. Laurie S. Starkey
Alcohol Synthesis Homework

Name: _____ Section: _____ (day/time)

A) Suggest **two** possible syntheses for the following target molecule (**TM**), starting with any **aldehyde** (start each synthesis with a different aldehyde). It may help to first consider a retrosynthesis of the TM.



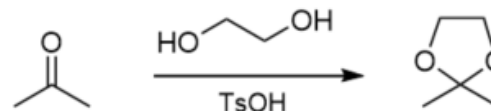
Hint! Possible aldehyde starting materials:



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Acetal Mechanism Homework

Name: _____ Section: _____ (day/time)

STOP! Before working on this homework, review Mechanism 19.6 and work on SkillBuilder 19.3. Provide complete mechanisms for both the formation of the cyclic acetal and then the hydrolysis of the acetal. Pay close attention to details, including lone pairs, formal charges and the use of curved arrows.



Acetal formation
mechanism:

All Course Points go through Gradescope

Exam I assignments*		Exam II assignments*		Exam III assignments*		Homework Course Points 125 (25%) *assignments due no later than date of each exam
WileyPLUS/textbook		WileyPLUS/textbook		WileyPLUS/textbook		
SkillBuild/EOC Ch. 11	10	SkillBuild/EOC Ch. 19	10	SkillBuild/EOC Ch. 21	10	
SkillBuild/EOC Ch. 12	10	SkillBuild/EOC Ch. 20	10	SkillBuild/EOC Ch. 17	5	
SkillBuild/EOC Ch. 13	10			SkillBuild/EOC Ch. 18	10	
"Free Red Ink Homework"		"Free Red Ink Homework"		"Free Red Ink Homework"		
Hmwk - Ch. 11 EOC/Review	5	Hmwk ROH synthesis	5	Hmwk 8 Messy Aldol	5	
Hmwk - Grignard	5	Hmwk acetal	5	Hmwk 9 biphenyl EAS	5	
Hmwk - epoxide	5	Hmwk hydrolysis	5	Hmwk 10 FC alkylation	5	
	45		40		40	

Friday Fives (4 pts each) (13+ earns max. credit)		52	OLC reports (1 pt each) (10+ reports earns max. credit)		10	Exam Wrappers (4 pts each, drop one)		8	Study/Reflection Course Points 75 (15%)
						Exam Corrections (4 pts each, drop one)		8	

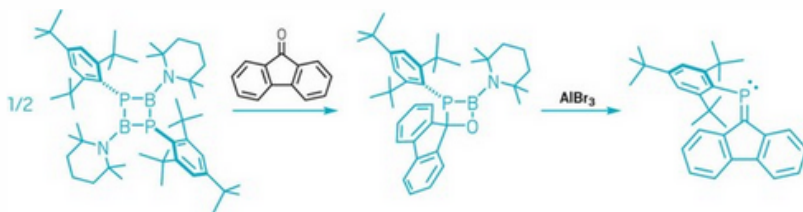
Midterm Exams x3			Final Exam			Midterms: 200 (40%) Final: 100 (20%)
	200	(100 pts each, drop lowest)			100	

Phospha-bora-Wittig reaction makes its debut

A new variant of the classic Wittig reaction offers a route to phosphalkenes

by **Mark Peplow**, special to C&EN

September 21, 2021



Credit: Adapted from *J. Am. Chem. Soc.*

A new phosphaborene dimer (left) reacts with a ketone to form a 4-membered intermediate (middle), similar to the intermediate formed using classic Wittig reagents. The intermediate then reacts with AlBr_3 to form a phosphalkene (right), a molecule with a carbon-phosphorus double bond.

Got Research? Synthetic Techniques are Continuously Being Developed

Putting a new twist on an old favorite of organic chemistry, researchers have unveiled the phospho-bora-Wittig reaction. It offers a relatively straightforward way to prepare phosphalkenes, which are used as **ligands** in transition-metal catalysts and as **polymer building blocks**. But its inventors, led by Michael J. Cowley of the University of Edinburgh, say that it might also help to expand the scope of the original Wittig reaction so that it works with a wider range of molecules (*J. Am. Chem. Soc.* 2021, DOI: [10.1021/jacs.1c06228](https://doi.org/10.1021/jacs.1c06228)).