

The Chemistry of Aldehydes & Ketones

February 14, 2020

- Acetals and ketals.
- The addition of amines to aldehydes and ketones.
- The addition of HCN to aldehydes and ketones.
- The Wittig reaction.

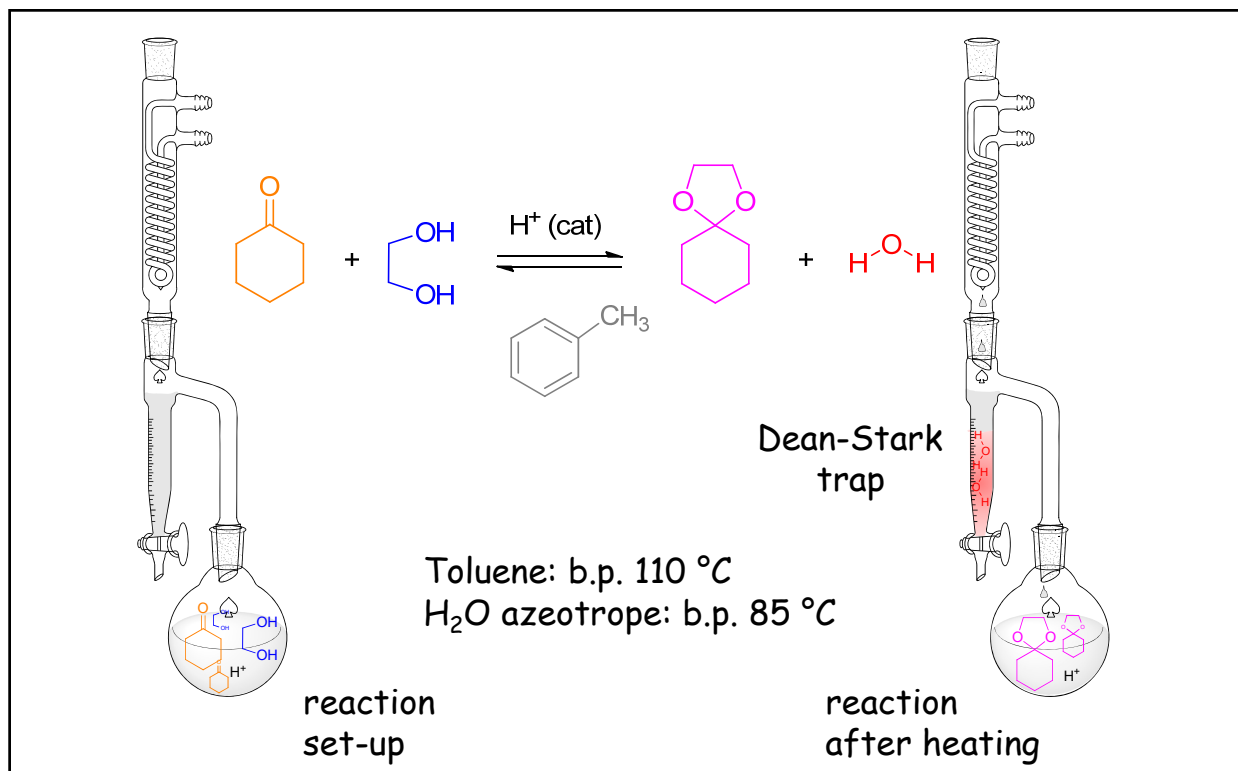
110b Teaching Fellows: Felipe Becerril, Christina Beck, Isabelle Cheng, Junha Gu, Nathalie Hong, Shy Lavasani, Allison Liu, Casey Morrison, Jerusalem Nerayo, Eric Tang, Baili Zhong, Martín Acosta Parra.

Chemistry Seminar! Prof. Kate Freeman, Penn State University, "Wildfires and Upheavals in the Cenozoic." Tuesday, February 18, 11:00 am, Seaver North Auditorium.

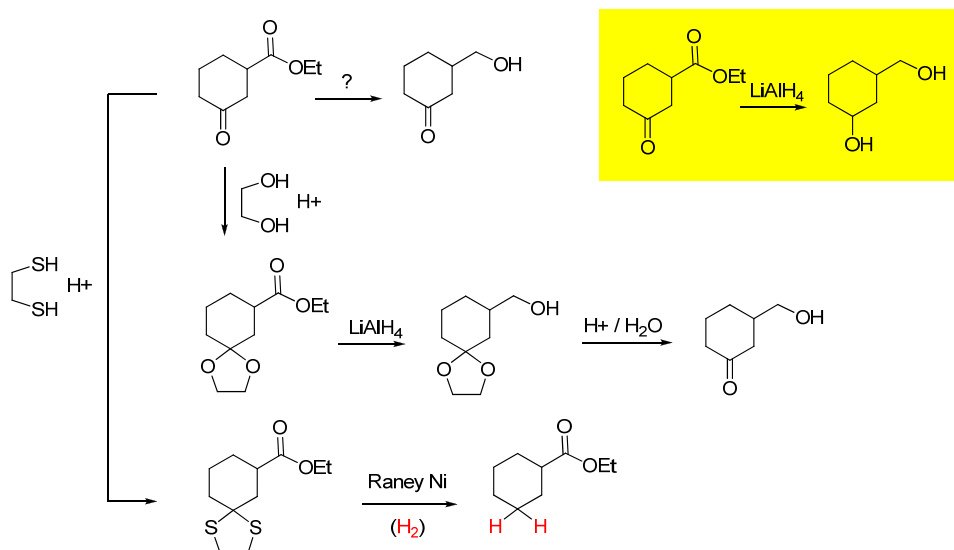
O'Leary office hours: T/Th 9:30-10:00 am, SN 208.

O'Leary's evening review session: Wednesdays 7:00 PM, SN Aud. **Course website:** <http://pages.pomona.edu/~djo04747/110/>

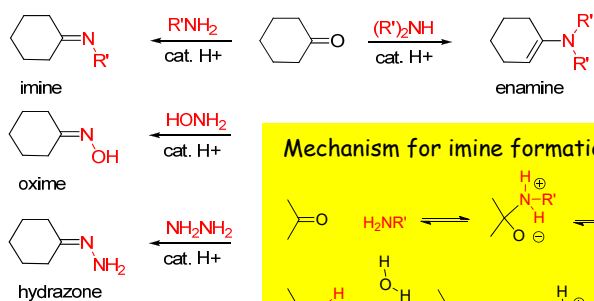
Suggested Problems for Exam 2. 10e: 16.20, 24, 30, 33, 35, 41, 44, 45, 47. 11e: 16.23, 27, 33, 36, 38, 44, 47, 48, 50. 10e/11e: 17.20, 17.28, 17.31, 17.33, 17.35, 17.38, 17.41, 17.42, 17.47.



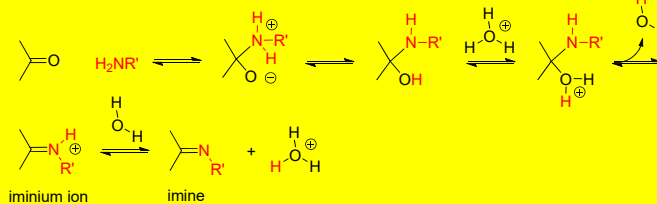
Acetals and Ketals: Synthetic Applications



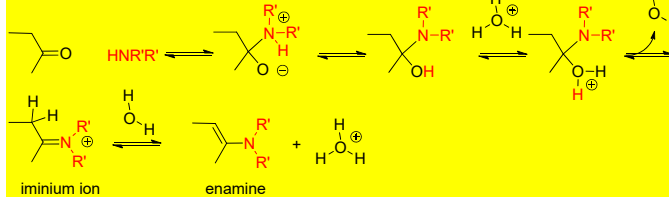
Addition of Primary and Secondary Amines to Aldehydes & Ketones: Imines & Enamines

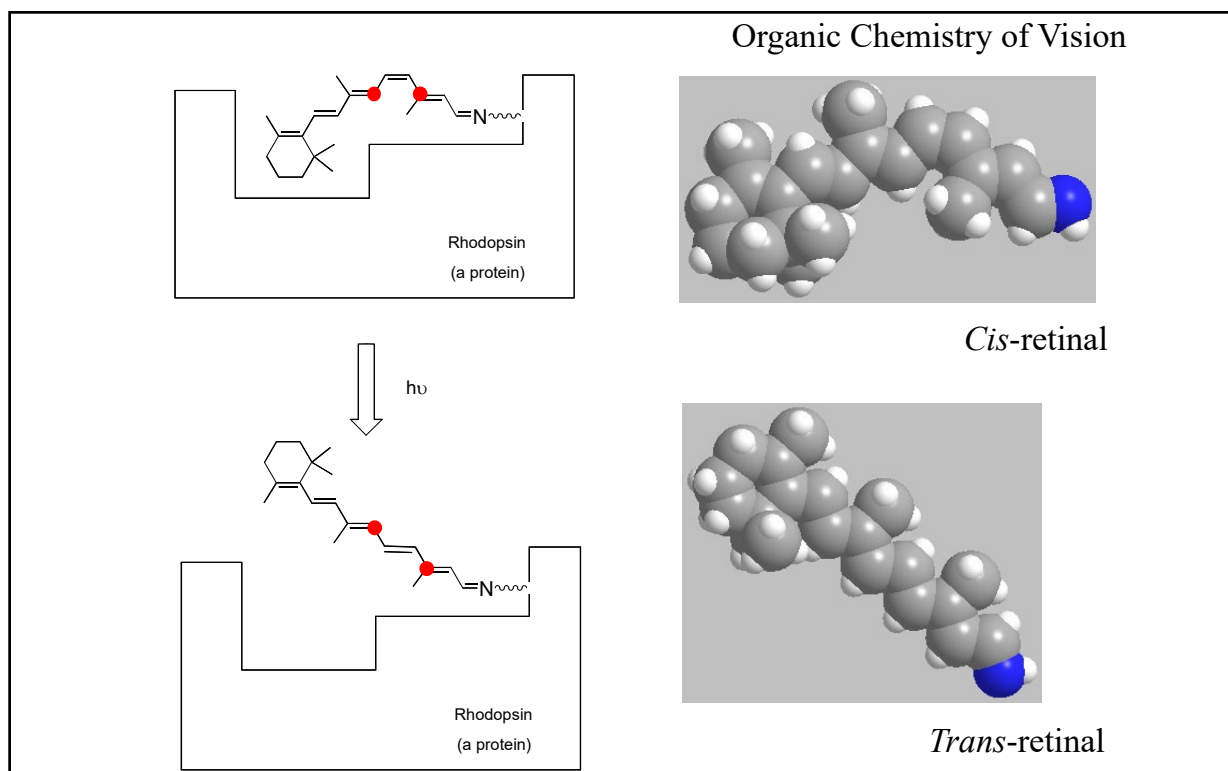
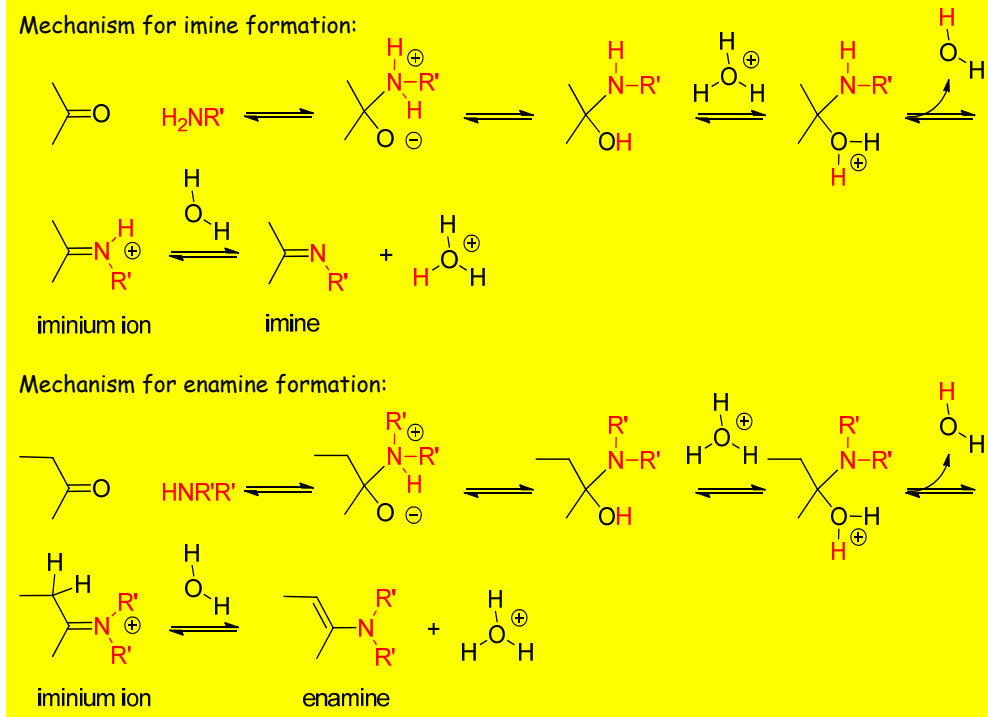


Mechanism for imine formation:



Mechanism for enamine formation:





Synthesis of *E*-vinylogous (*R*)-amino acid derivatives via metal-catalyzed allylic substitutions on enzyme-derived substrates

Donald R. Deardorff,* Cullen M. Taniguchi, Anna C. Nelson, Andrew P. Pace,
Alexander J. Kim, Aaron K. Pace, Regan A. Jones, Sanaz A. Tafti, Charles Nguyen,
Caitlin O'Connor, Judy Tang and Judy Chen

Department of Chemistry, Occidental College, Los Angeles, CA 90041, USA

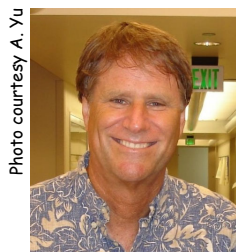
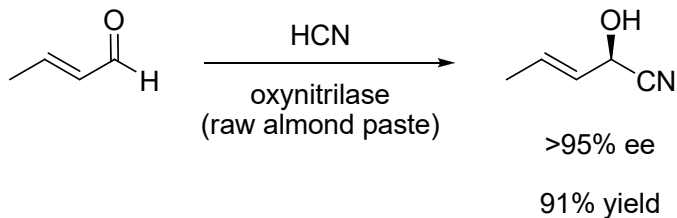


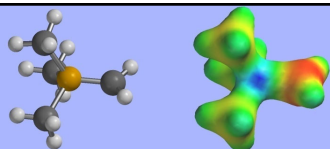
Photo courtesy A. Yu

Prof. Deardorff

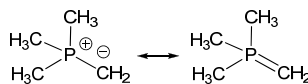


Trader Joe's raw almonds were fabulous!

Tetrahedron: Asymmetry **2005**, *16*, 1655-1661

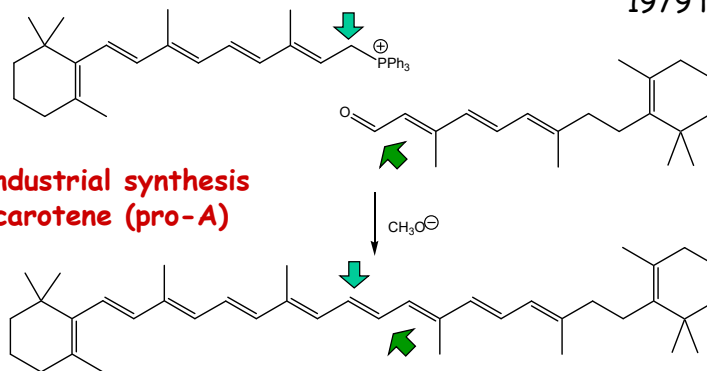


EPS of model ylide & resonance structures.



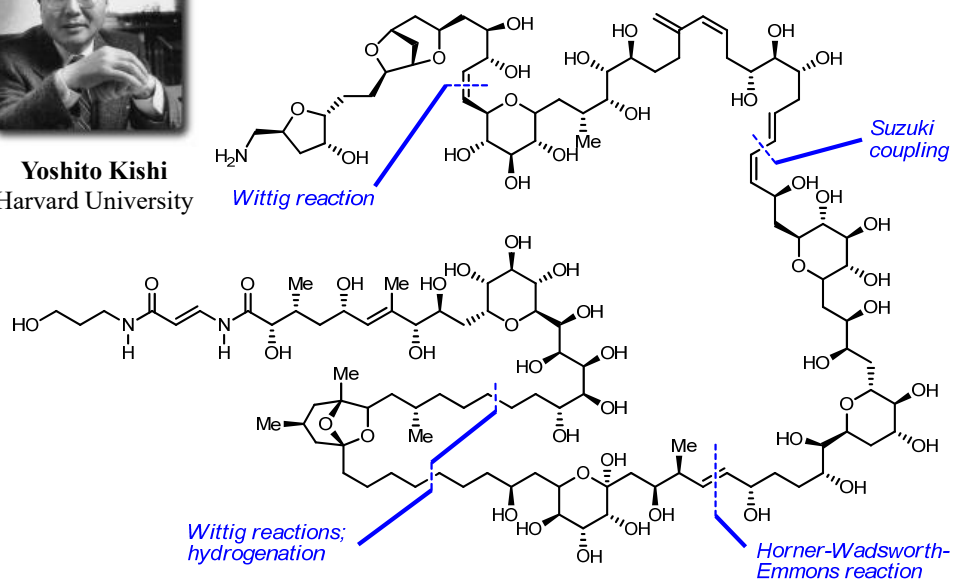
Georg Wittig
(1897-1987)
1979 Nobel Prize

**BASF industrial synthesis
of β -carotene (pro-A)**





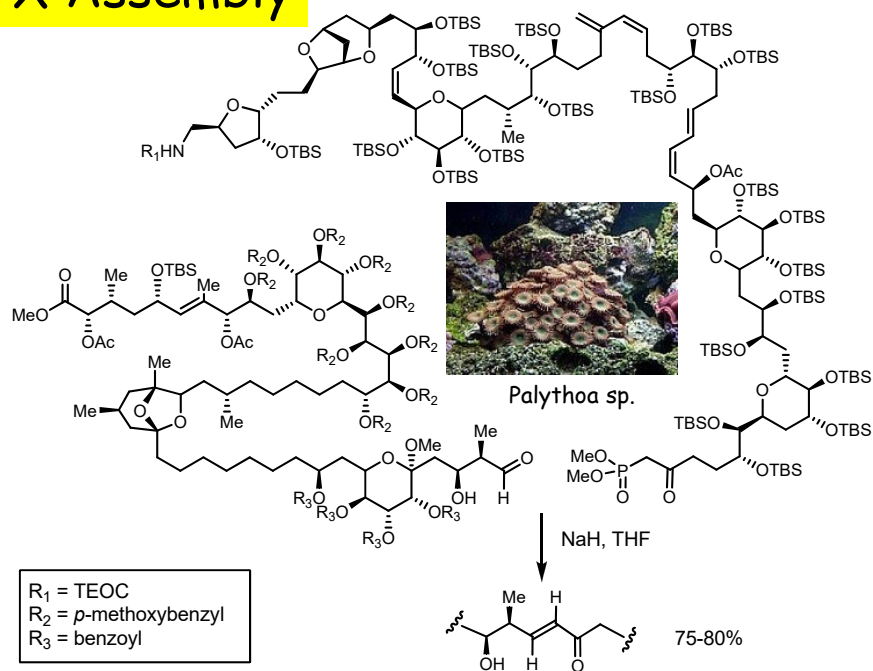
Yoshito Kishi
Harvard University



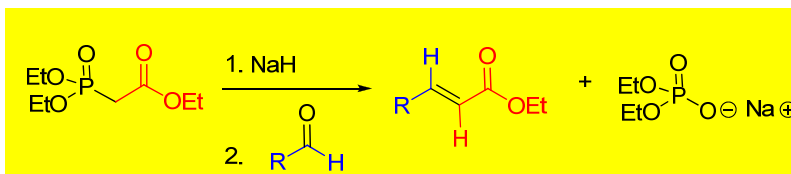
Palytoxin (PTX)

Total synthesis: 1994 (Kishi)
LD₅₀ (mouse, i.p.): 0.45 µg/kg

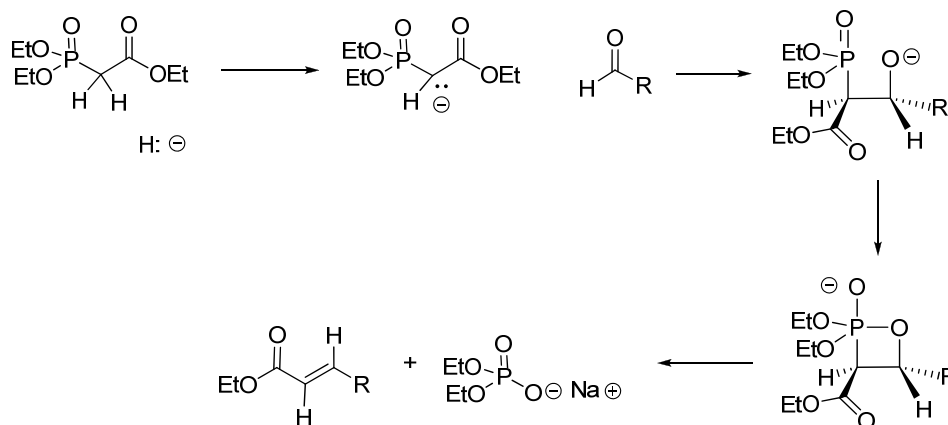
PTX Assembly



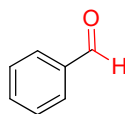
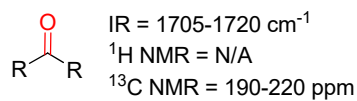
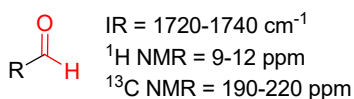
Mechanism of the Horner-Wadsworth-Emmons Reaction



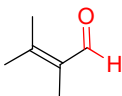
Mechanism:



Aldehydes and Ketones: Spectroscopic Data



IR = 1695-1715 cm^{-1}



IR = 1680-1690 cm^{-1}



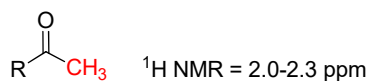
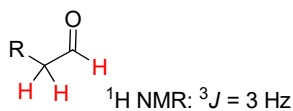
IR = 1715



1751



1785 cm^{-1}



<http://www.youtube.com/watch?v=oKETXMWtkBE>

Chemical Test: Tollen's Silver Mirror

