

**Cumulative Examination
Organic Chemistry**

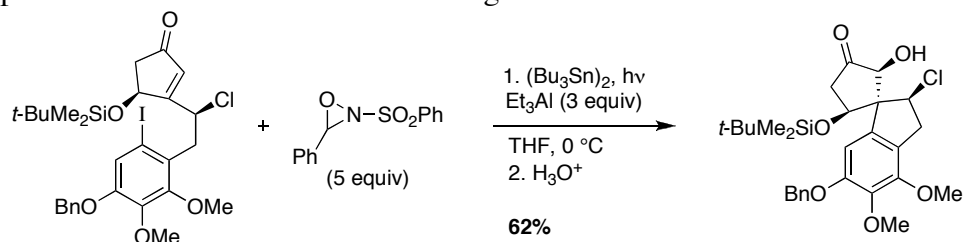
March 4, 2010

Tom Driver

Instructions:

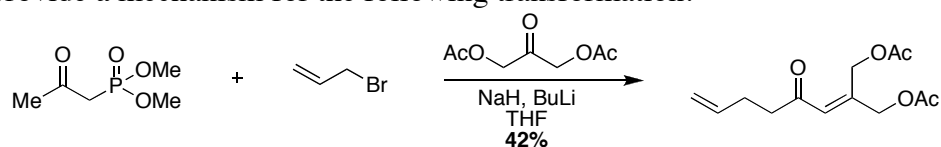
- (1) Attempt All Questions (100 pts total)**
- (2) When an explanation is required show relevant MO's, a mechanism, or a 3-D drawing and if necessary use complete sentences.

1. Please provide a mechanism for the following transformation.



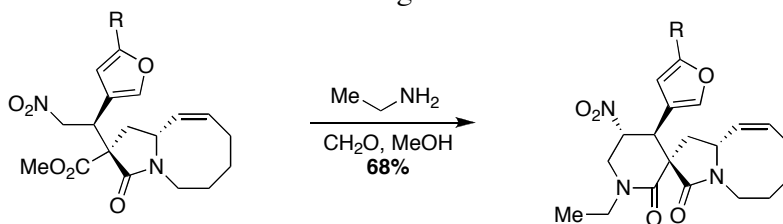
Fang, L.; Castle, S. L. *Org. Lett.* **2007**, *9*, 4033.

2. Please provide a mechanism for the following transformation.



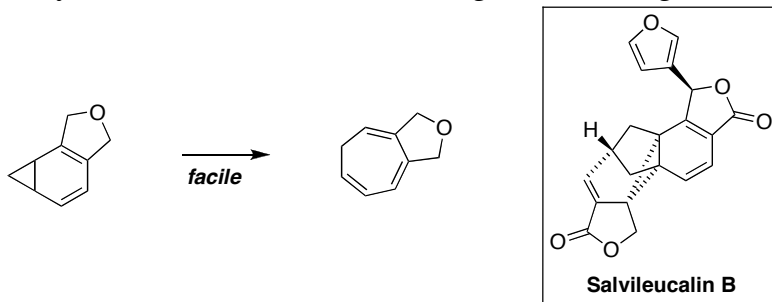
Jakubec, P.; Cockfield, D. M.; Dixon, D. J. *J. Am. Chem. Soc.* **2009**, *131*, 16632.

3. Please provide a mechanism for the following transformation.



Jakubec, P.; Cockfield, D. M.; Dixon, D. J. *J. Am. Chem. Soc.* **2009**, *131*, 16632.

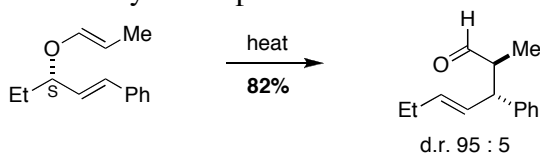
4. Norcaradienes typically rearrange to give a more thermodynamically stable cycloheptatrienes. Provide a mechanism for the rearrangement of norcaradiene, and provide an explanation why Salvileucalin B does not undergo this rearrangement.



Levin, S.; Nani, R. R.; Reisman, S. *Org. Lett.* **2010**, doi: 10.1021/ol902848k.

5. From Prof. Scott Nelson's Seminar—02/23/2010

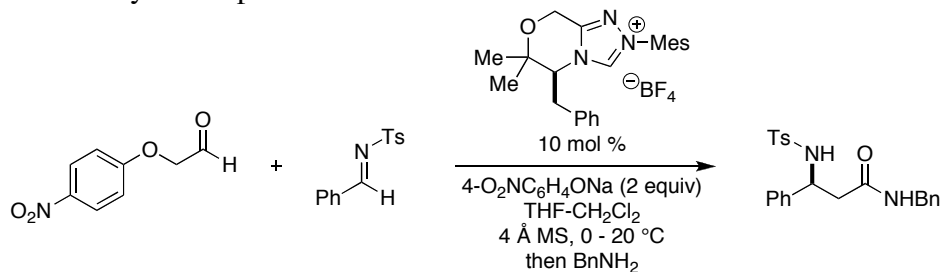
Please provide a mechanism for the following transformation. Provide a transition state to account for the diastereoselectivity of the process.



Nelson, S. G.; Wang, K. *J. Am. Chem. Soc.* **2006**, 128, 4231.

6. From Prof. Karl Scheidt's Seminar—02/27/2010

Please provide a mechanism for the following transformation. Please account for the diastereoselectivity of the process.



Kawanaka, Y.; Phillips, E. M.; Scheidt, K. A. *J. Am. Chem. Soc.* **2009**, 131, 18028.