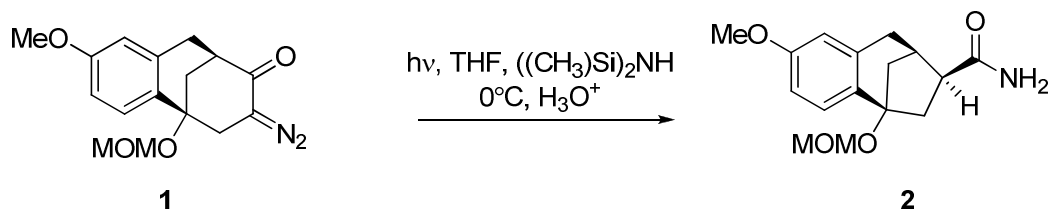
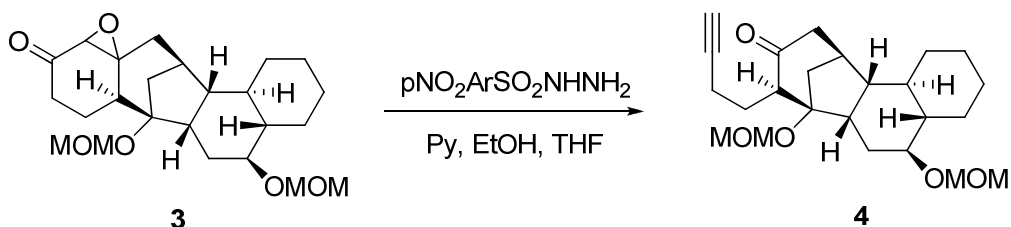


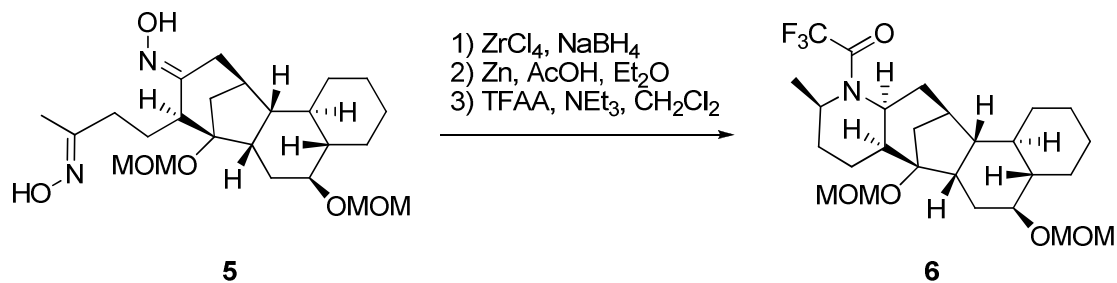
- 1) Show the mechanism for the following Wolff ring contraction:



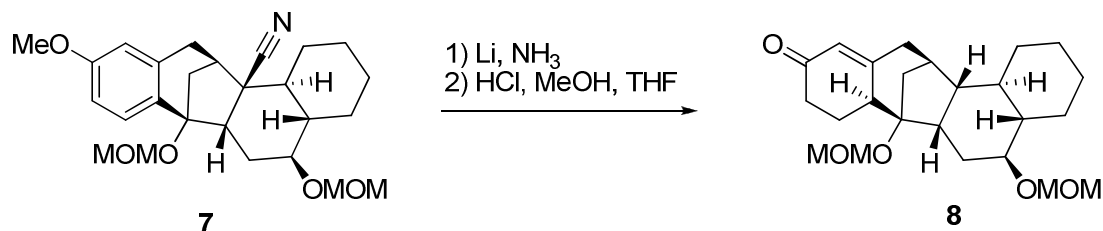
- 2) Show the mechanism for the following Eschenmoser fragmentation. How is the reagent above the arrow different from what is normally used in this type of transformation?



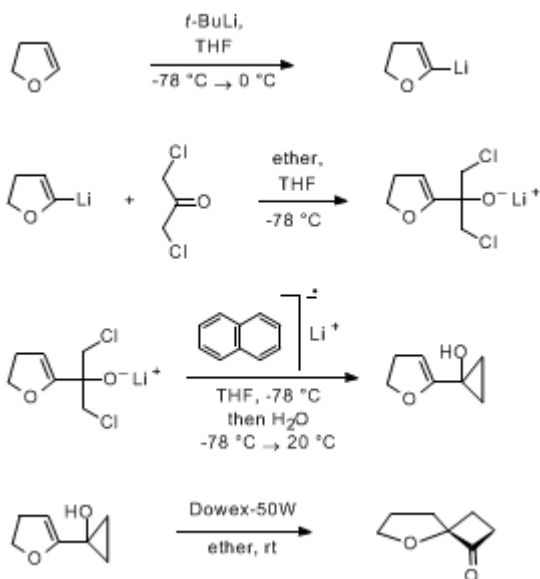
- 3) Following reductive amination of **4**, reductive cyclization of the bis-oxime **5** was accomplished using $\text{ZnCl}_4/\text{NaBH}_4$. The N-hydropiperidine intermediate was reduced, followed by protection as the trifluoroacetamide. Show the mechanism of the reductive cyclization step.



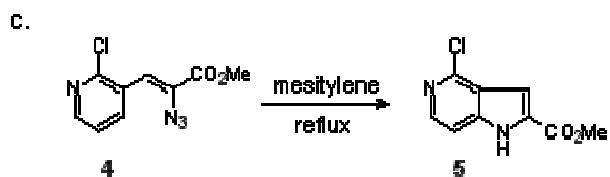
- 4) The Birch reduction is a well known reduction of aromatic rings. Show the mechanism for the Birch reduction below:



5) Show the mechanism of the following steps:



6) Show the mechanism of the following reaction:



7) Draw the mechanism:

