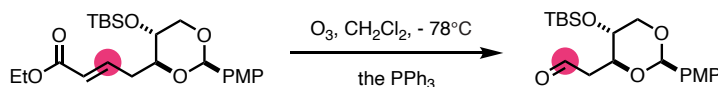
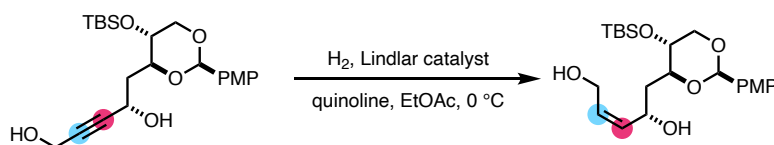


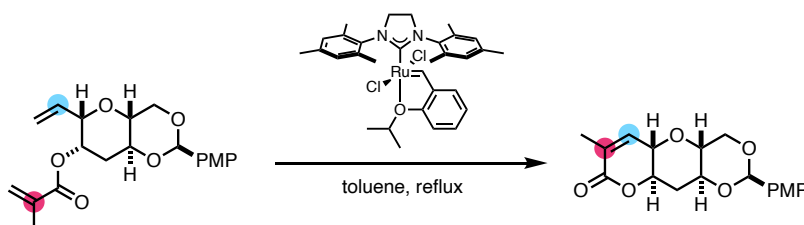
1. What is the role of triphenylphosphine in the following transformation? (PMP, *para*-methoxyphenyl; TBS, *tert*-butyldimethylsilyl) [★]



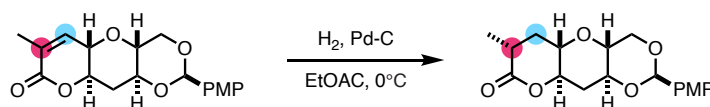
2. How can the stereoselectivity of the transformation be explained? How can the hydrogenation stop at the alkene stage? [★★]



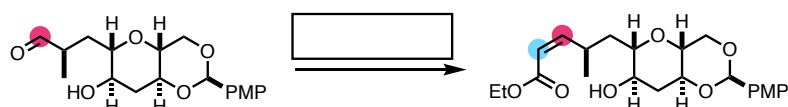
3. What is the name of the following transformation? Outline the catalytic mechanism of the reaction. Can you rationalize why the reaction was performed at 18 mM concentration? [★★]



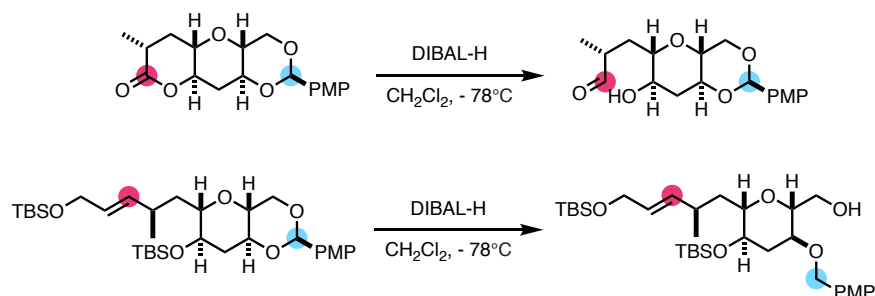
4. Rationalize the diastereoselectivity of the following hydrogenation reaction. Hypothesize why the reaction was conducted at reduced temperature. [★★★★]



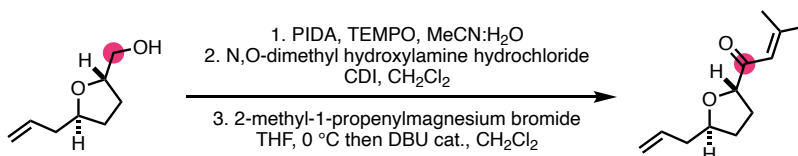
5. Propose a set of conditions that could generate the *Z*-isomer and explain the observed selectivity. [★★★★]



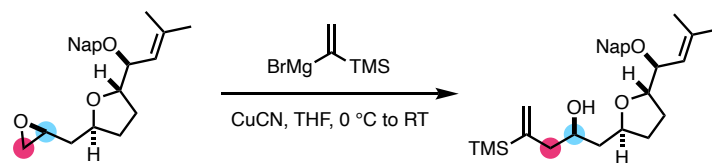
6. What conclusion on chemoselectivity and functional group reactivity can be drawn from the following two transformations? (DIBAL-H, *diisobutylaluminum hydride*) [★★]



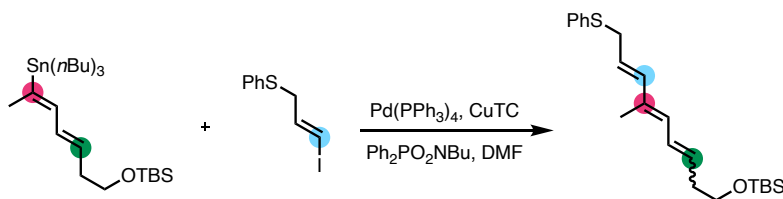
7. In the following sequence, outline the mechanism of the TEMPO-mediated oxidation. Can the oxidation be potentially stopped at the aldehyde oxidation state? Why is the installation of Weinreb amide required? What is the role of DBU in the final transformation? (CDI, Carbonyldiimidazole; DBU, 1,8-diazabicyclo(5.4.0)undec-7-ene; PIDA, (diacetoxyiodo)benzene; TEMPO, (2,2,6,6-Tetramethylpiperidin-1-yl)oxyl) [★★]



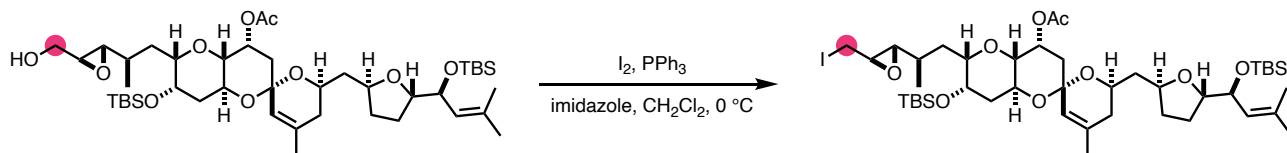
8. In the following transformation, what is the role of Cu(I) in the transformation? (Nap, 2-naphthylmethyl, TMS, trimethylsilyl) [★]



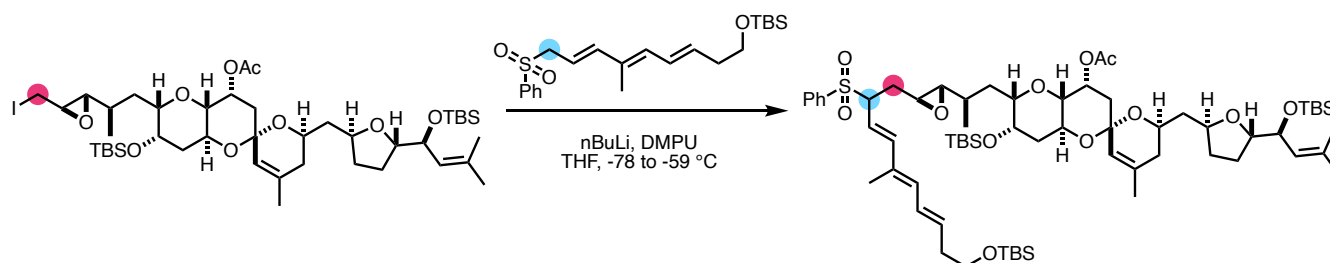
9. Propose a mechanism for the following isomerization reaction, which occurs during the Stille coupling. (TC, thiophene-2-carboxylate) [★★]



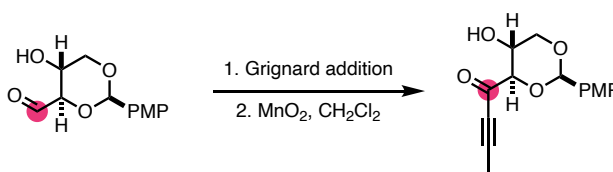
10. Describe the mechanism of the Appel reaction. [★]



11. This reaction represents the first step of another widely used name reaction. Which one? What is the second step?
(DMPU, *N,N*-dimethylpropyleneurea) [★★]



12. Why was manganese dioxide selected as oxidant in this transformation? [★]



13. Outline the mechanism of the following transformation. [★★]

