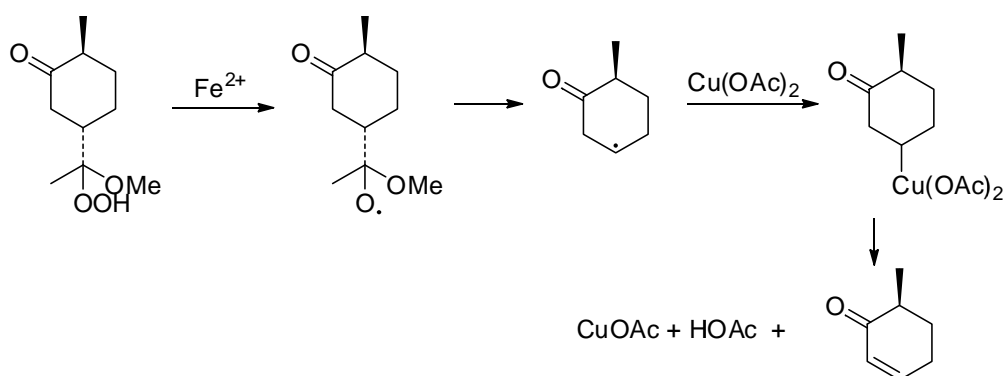


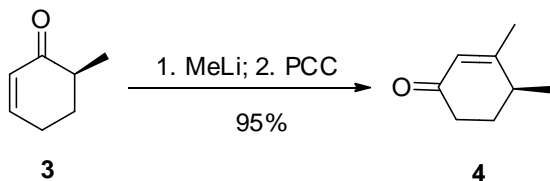
Problems:

1. Explain the processes from **2** to **3**.
2. Propose an approach from **3** to **4**.
3. Give the conditions from **4** to **6**, and the structure of **6**.
4. Give the conditions from **8** to **10**, and the structure of **10**.
5. Please give the mechanism of the reaction from **10** to **11**.

- Transfer of an electron from  $\text{Fe}^{2+}$  to the peroxide produces the oxy radical. Carbon radical was then formed through the cleavage of C-C bond. Oxidative coupling with  $\text{Cu}(\text{OAc})_2$  yields a alkyl copper intermediate. In this case, the ketone functionality appears to direct elimination of the presumed  $\beta$ -copper intermediate to form the  $\alpha,\beta$ -unsaturated enone.

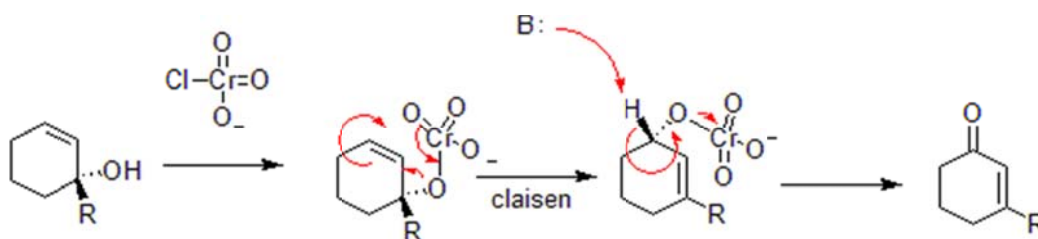


2.

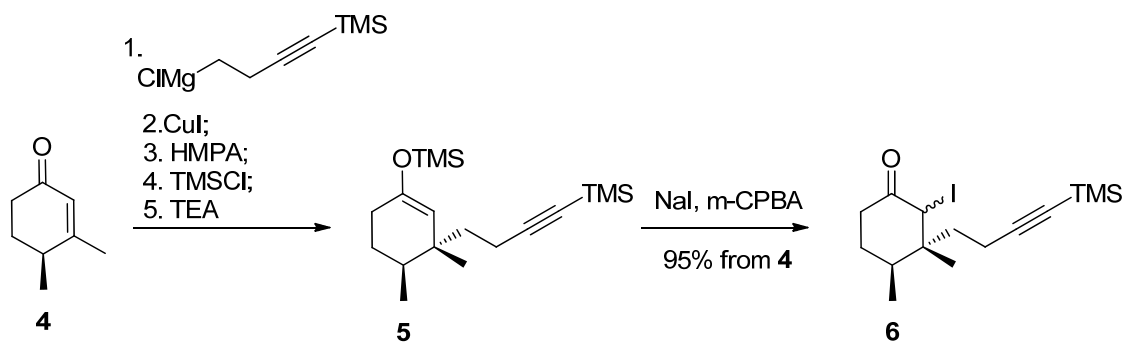


### Chromium oxidation

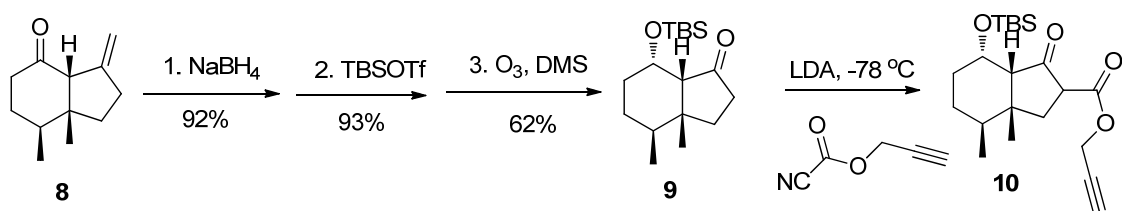
Chromium can oxidize allylic alcohols to  $\alpha,\beta$ -unsaturated ketones on the opposite side of the unsaturated bond from the alcohol. This is via a concerted hetero-Claisen reaction, although there are mechanistic differences since the chromium atom has access to d-shell orbitals which allow the reaction under a less constrained set of geometries.



3.



4.



5.

Manganese triacetate in ethanol effected radical cyclization adduct radicals, following H-atom transfer from ethanol to give products.