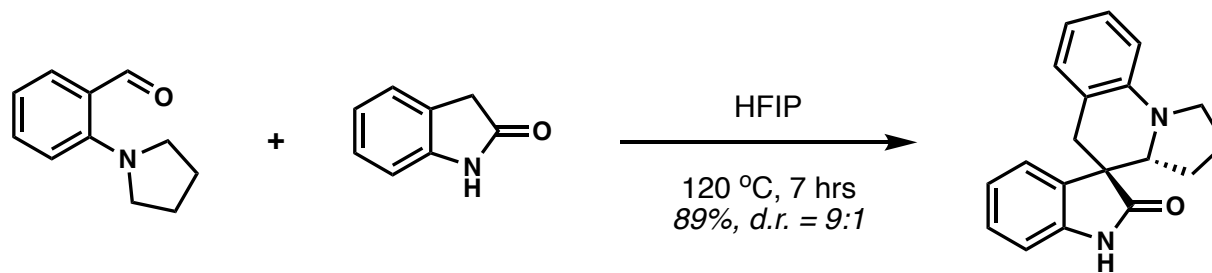


3, 2, 1... Shift Off!

---

1. Provide a mechanism for the following transformation. Can you account for the observed diastereoselectivity?

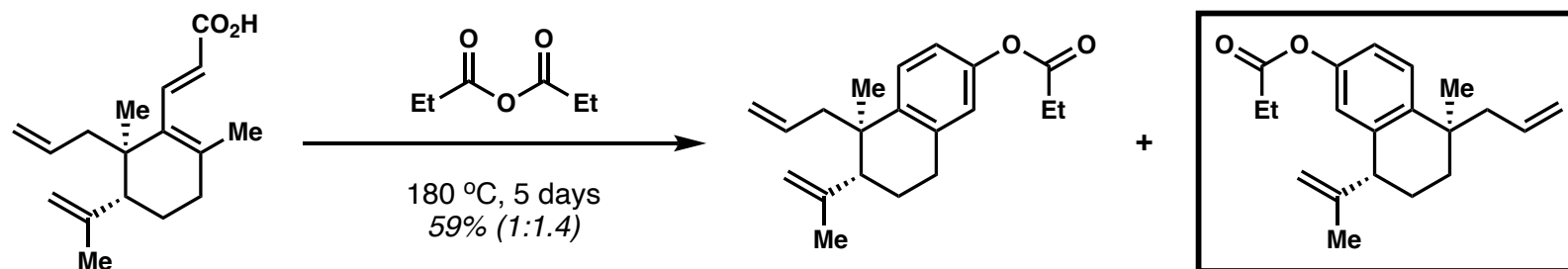
Wang, Li, *Org. Biomol. Chem.*, 2018, 16, 7109



3, 2, 1... Shift Off!

2. En route to their synthesis of crotogoudin, Sarpong and coworkers observed the formation of an undesired side product when they heated the acid below in propionic anhydride. Provide a mechanism that accounts for the formation of this side product.

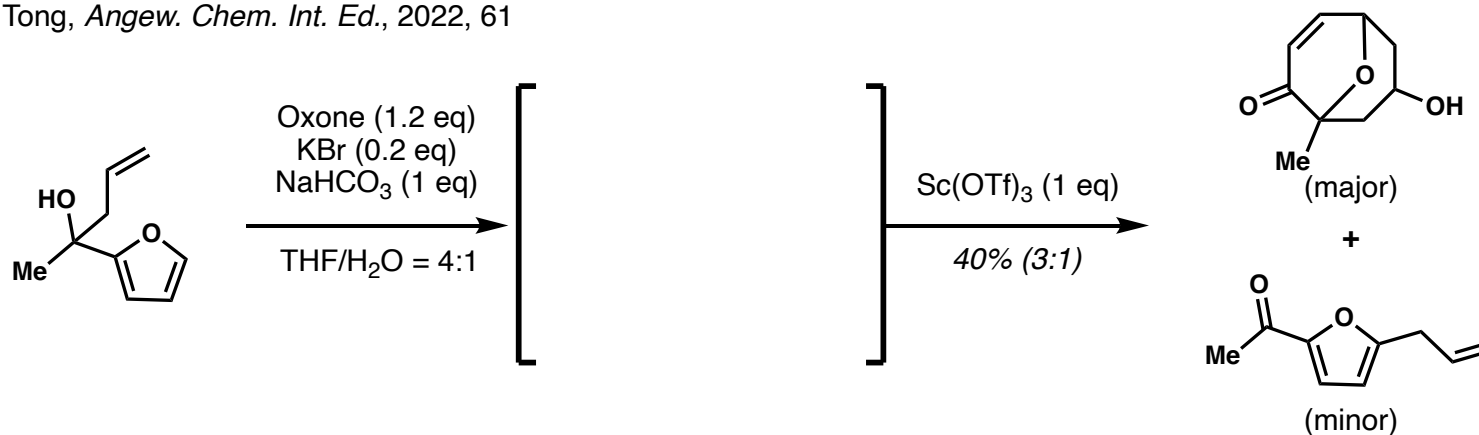
Sarpong, *J. Am. Chem. Soc.*, 2017, 139, 11349



3, 2, 1... Shift Off!

3a. Yao, Tong and coworkers observed a minor and unexpected product from the following transformation. Provide the structure of the intermediate in brackets and a mechanism for the formation of the minor product. What are the names of the reactions that produce the intermediate and the major product?

Yao, Tong, *Angew. Chem. Int. Ed.*, 2022, 61



3b. Is the formation of the minor product possible by directly heating the starting material or treating it with base? Why or why not?