

Reading instructions for

“Nishibayashi et al. Cooperative Catalytic Reactions Using Organocatalysts and Transition Metal Catalysts: Propargylic Allylation of Propargylic Alcohols with α,β -Unsaturated Aldehydes” *Organomet.* **2012**, *31*, 3810.
(DOI: 10.1021/om300286b)

Things to think about before discussion:

1. The heart of this paper lies in Tables 1, 2, and 3. What information are these tables providing us with? What is the difference between them, and why do we care?
2. Think about the enantioselectivity and diastereoselectivity of this reaction. What are the possible stereoisomers of product **6**, and which of these do you think are major/minor products?
3. Look at scheme 2: What is the electron count for each of the metal complexes involved? By what kind of mechanism is the organometallic complex reacting? Do you buy this reaction scheme? Why do you think the authors propose this mechanism?
4. How do the catalysts activate their respective substrates? What does it mean for these to be cocatalysts?

Useful information

Terms to know:

1. Propargyl: an alkynyl functional group with the structure $\text{HC}\equiv\text{C}-\text{CR}_2-$.
2. Vinylidene: refers to two adjacent double bonds, as in $\text{R}=\text{C}=\text{R}$
3. Allenylidene: refers to three adjacent double bonds, as in $\text{R}=\text{C}=\text{C}=\text{R}$
4. Dienamine: refers to an enamine with two conjugated double bonds.
5. Propargylic allylation: the installation of an allyl group ($-\text{CR}_2=\text{CR}_2$) at the propargylic position of a substrate (one carbon away from a C-C triple bond).

Propargylic allylation reaction scheme (see following page):

