

[Paper #7 – “Asymmetric \[4 + 3\] Cycloadditions between Benzofuranyldiazoacetates and Dienes: Formal Synthesis of \(+\)-Fronodosin B” by J.P. Olson and H.M.L. Davies, \*Org. Lett.\*, 2008, 10\(4\), 573-576 \(DOI 10.1021/ol702844g\)](#)

Classroom discussion: Wednesday, April 1.

This paper blends together several chemical reactions and concepts that we have been studying this term. It also illustrates how a reaction (the divinylcyclopropane Cope rearrangement) that might have struck you as highly esoteric when we examined it in class can actually have practical value when some creative thinking is applied to it.

Turn these items in at the start of class:

1. *Three* questions about the paper that you would like to ask the rest of the class. Please do not share them ahead of class. (I'm going to put the questions in a hat and draw them out randomly to create our discussion). Also, spread your questions across the following topics: one question about terminology, one question about chemistry, and one question about the spectral data for compound **11** (see below). Please *provide answers* to the terminology and spectroscopy questions.
2. Draw a mechanism for the “rhodium-catalyzed [4+3] cycloaddition.” Feel free to look up papers on this topic for mechanistic ideas. Don't worry about the role of the chiral ligand or the stereoselectivity of the *metal-catalyzed* step, but do provide information about stereoselectivity for the thermal rearrangement. (*Note*: many papers refer to “transition metal-catalyzed pericyclic reactions” that are only pericyclic in the formal sense, i.e., the overall transformation looks like a pericyclic reaction, but the mechanism is step-wise and does not involve a cyclic transition state.)
3. Construct an explanation for as much of the spectral data for compound **11** as you can manage (for the  $^{13}\text{C}$  NMR, make sure you can assign the signals between 0-100 ppm). The spectral data are located in the Supporting Info (available online). Remember that it is not unusual for errors to creep into these data and that it can be helpful to look at spectra of structurally similar compounds when trying to assign data.