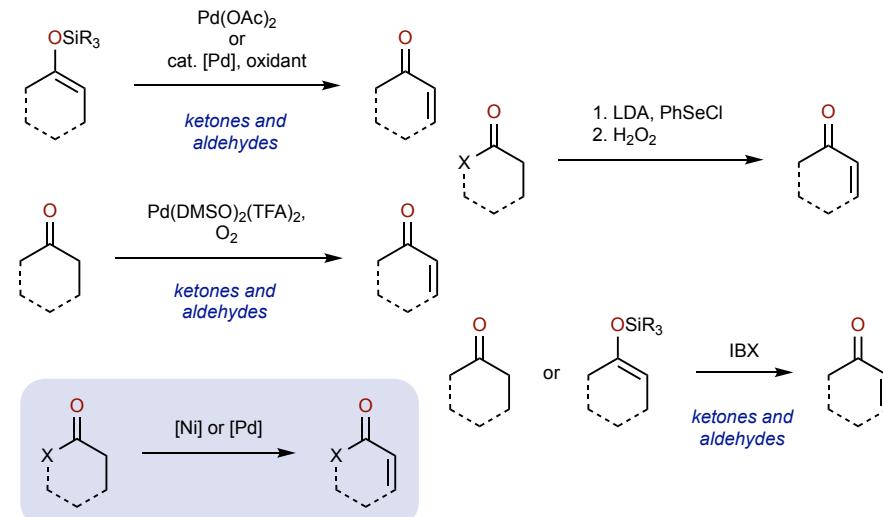
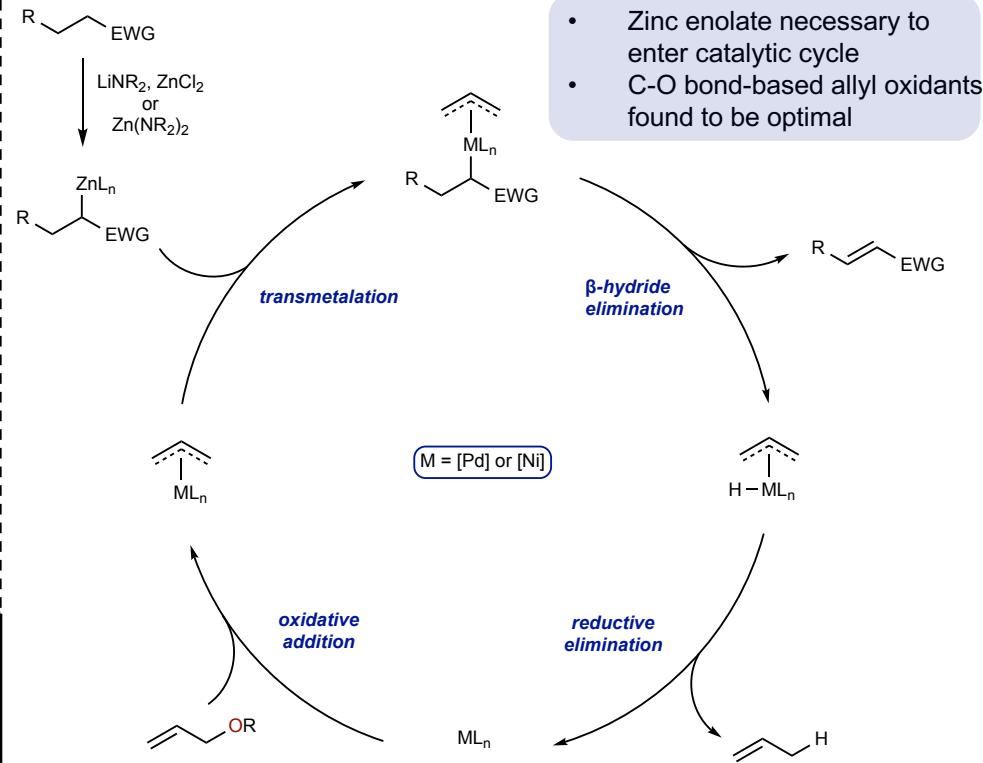


## Frequently Utilized Dehydrogenation Methods:



## Proposed Catalytic Cycle:

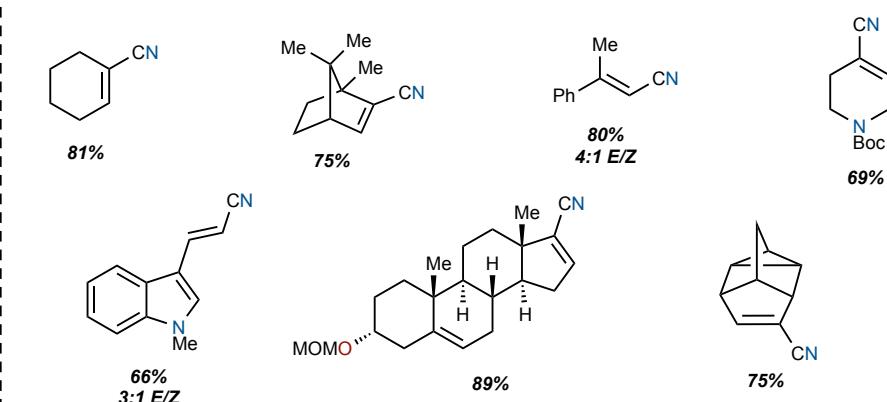
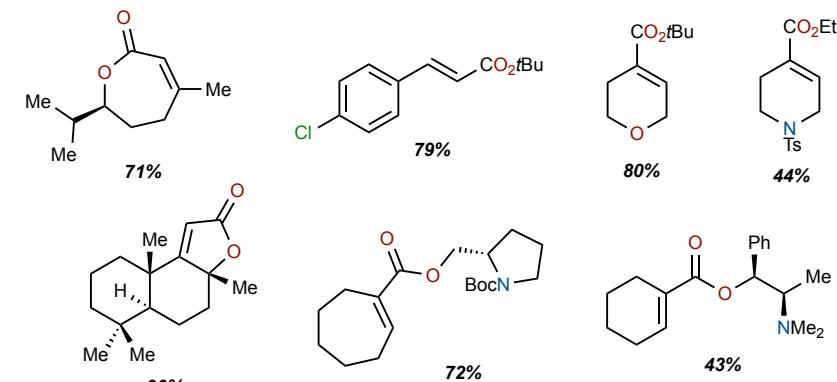


Acc. Chem. Res. 2021, 54, 1118–113

## Dehydrogenation of Esters and Nitriles:

Ester Standard Conditions: LiTMP, ZnCl<sub>2</sub>, allyl pivalate, [Pd(allyl)Cl]<sub>2</sub>, -40 °C to rt

Nitrile Standard Conditions: LiTMP, ZnCl<sub>2</sub>, allyl acetate, [Pd(allyl)Cl]<sub>2</sub>, -40 °C to rt

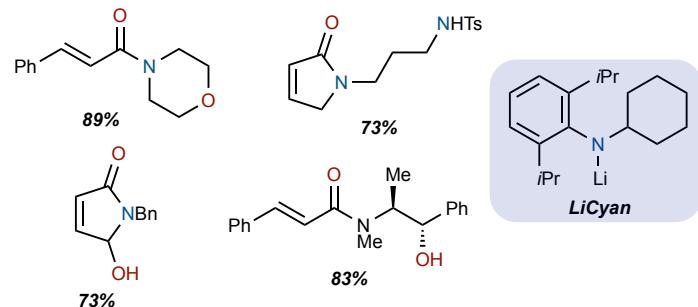


J. Am. Chem. Soc. 2015, 137, 5875–58780

# Dehydrogenation (Newhouse)

## Amides:

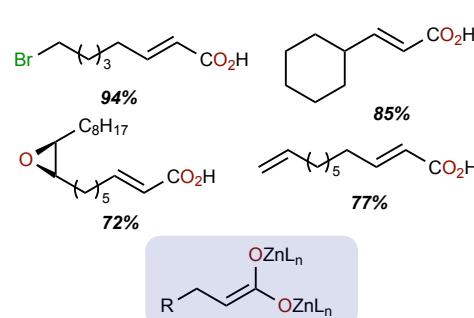
LiCyan, ZnCl<sub>2</sub>, allyl acetate, [Pd(allyl)Cl]<sub>2</sub>



J. Am. Chem. Soc. 2016, 138, 1166–1169

## Acids:

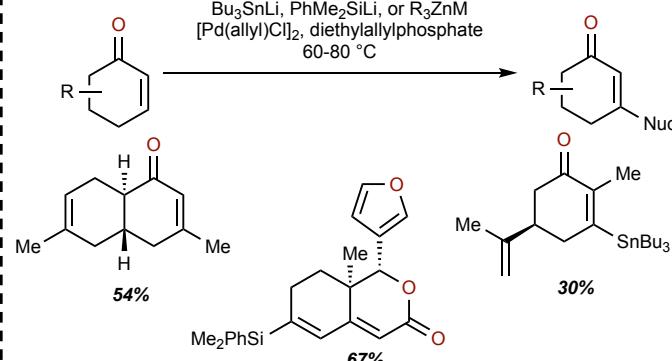
Zn(TMP)<sub>2</sub>·2LiCl, ZnCl<sub>2</sub>, allyl acetate, [Pd(allyl)Cl]<sub>2</sub>



Angew. Chem. Int. Ed. 2017, 56, 13122–13125

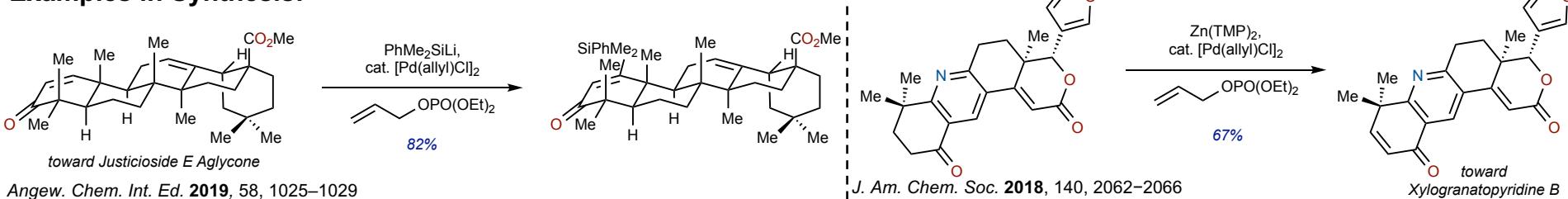
## β-functionalization:

Bu<sub>3</sub>SnLi, PhMe<sub>2</sub>SiLi, or R<sub>3</sub>ZnM  
[Pd(allyl)Cl]<sub>2</sub>, diethylallylphosphate  
60–80 °C



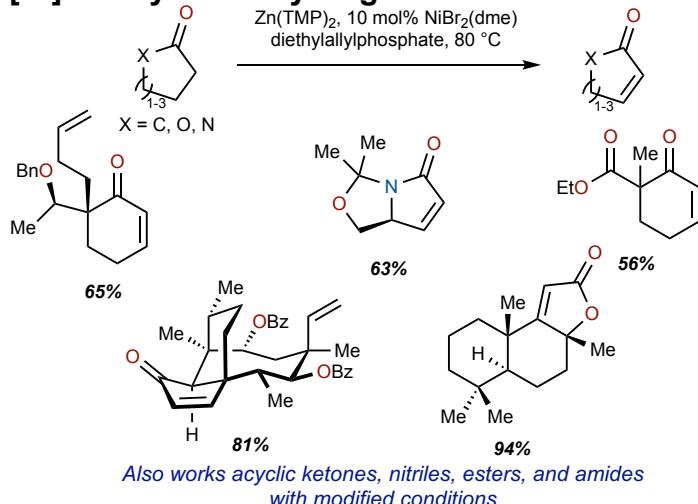
J. Am. Chem. Soc. 2018, 140, 2062–2066

## Examples in Synthesis:



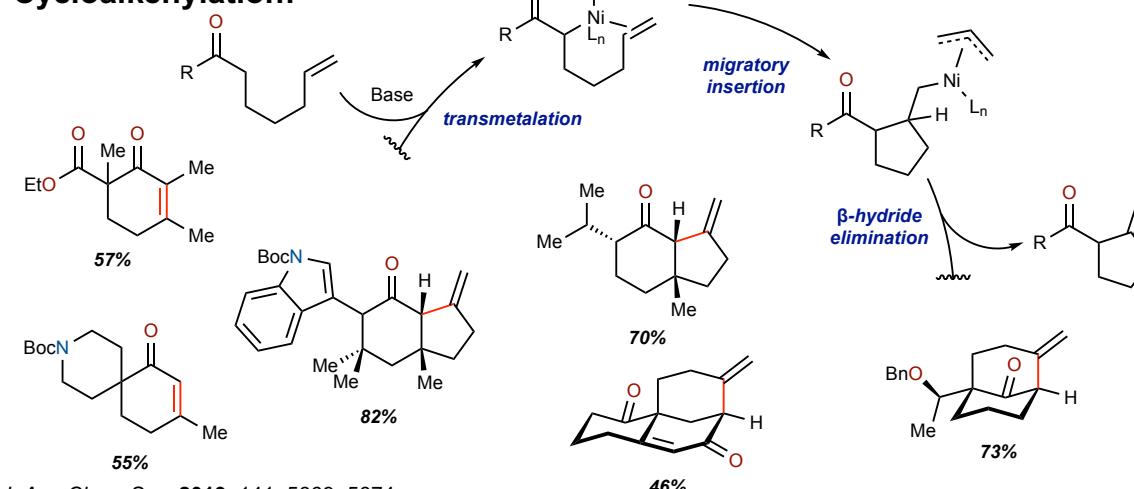
Angew. Chem. Int. Ed. 2019, 58, 1025–1029

## [Ni] Catalyzed Dehydrogenation:



Also works acyclic ketones, nitriles, esters, and amides with modified conditions

## Cycloalkenylation:



J. Am. Chem. Soc. 2019, 141, 5669–5674