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Synthesis of Lactones and Lactams from Vinylcyclopropane by Palladium-Catalyzed Nucleophilic Allylation

Palladium-Catalyzed Nucleophilic Allylation of Aldehydes or Aldimines

Significance: Ring-expansion reactions of vinylcyclopropanes are powerful tools for organic synthesis. The authors describe the palladium-catalyzed nucleophilic allylation of aldehyde and aldmines with vinylcyclopropane in the presence of dimethylzinc.

Comment: The allylation of aldehydes with vinylcyclopropane and diethylzinc proceeded to provide homoallyl alcohols with anti stereoselectivity. Aldimines prepared from aldehyde and primary amines in situ underwent a similar allylation to give homoallylamines with syn stereoselectivity. The products can be converted by reaction with a tetranuclear zinc cluster into γ-vinyl-δ-valerolactones and γ-vinyl-δ-valerolactams. The transformation is useful for the efficient synthesis of bioactive molecules.