SYNFACTS

Highlights in Current
Synthetic Organic
Chemistry

REPRINT

Thieme

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Construction of Vicinal Tertiary and All-Carbon Quaternary Stereocenters via Ir-Catalyzed Regio-, Diastereo-, and Enantioselective Allylic Alkylation and Application in Sequential Pd Catalysis

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Category

Metal-Catalyzed Asymmetric Synthesis and Stereoselective Reactions

Key words

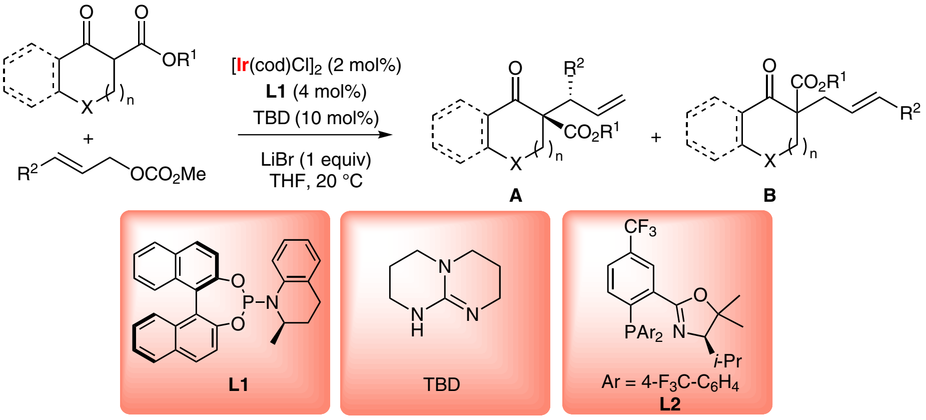
iridium

alkylation

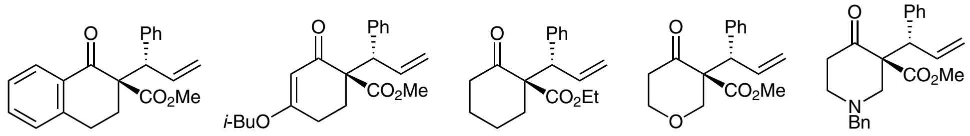
β-keto esters

phosphoramidite

All-Carbon Quaternary Stereocenters via Iridium-Catalyzed Allylic Alkylation



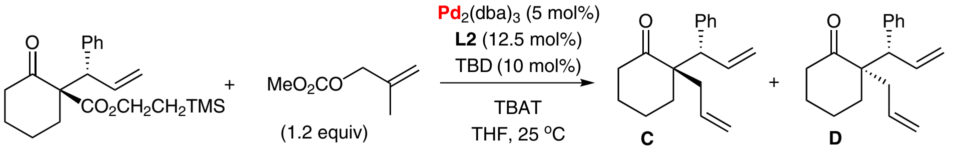
Selected examples:



A/**B** = 95:5	**A**/**B** = 91:9	**A**/**B** = 90:10	**A**/**B** = 90:10	**A**/**B** = 85:15
98% yield	99% yield	88% yield	88% yield	85% yield
dr = >20:1	dr = 20:1	dr = 20:1	dr = 16:1	dr = 13:1
>99% ee	>99% ee	98% ee	98% ee	97% ee

(isolated yield for **A** and **B**; dr of **A**; ee of the major diastereomer **A**)

Palladium-catalyzed decarboxylative allylic alkylation:



85% yield (**C** and **D**)
dr (**C**/**D**) = 18:1

Significance: The authors describe an iridium-catalyzed highly regio-, diastereo-, and enantioselective α-alkylation of cyclic β-keto esters, offering direct access to all-carbon quaternary stereocenters having a vicinal tertiary center. This finding is highly desirable, given the prevalence of such structural motifs in natural products and the challenges associates in the enantioselective synthesis of such structural dyads.

Comment: The iridium-catalyzed allylation product of 2-(trimethylsilyl)ethyl β-keto ester was used as a substrate for the palladium-catalyzed allylation reaction, delivering bis-allylated α-quaternary ketone **C** with excellent diastereoselectivity (dr = 18:1). This merging strategy is intriguing.

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