

Abstracts

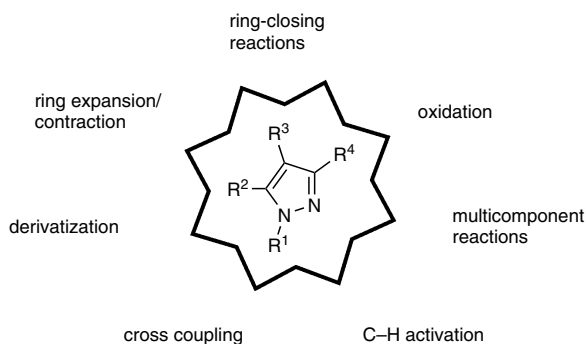
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12.1.5 Pyrazoles

A. C. Götzinger and T. J. J. Müller

This review presents an overview of the developments in pyrazole synthesis since the beginning of the 21st century. It includes the synthesis of the pyrazole core by ring-closing reactions, ring expansion or contraction, and aromatization. The introduction of substituents onto the pyrazole ring is also covered. Novel synthetic methods that have been developed since the original *Science of Synthesis* review on pyrazoles (Section 12.1) include various multicomponent approaches in which multiple bonds are formed, cross coupling, and C–H activation reactions of pyrazole derivatives.



Keywords: pyrazoles · nitrogen heterocycles · ring-closing reactions · condensation reactions · multicomponent reactions · ring expansion · ring contraction · aromatization · regioselectivity · 1,3-dicarbonyl compounds · hydrazines · hydrazones · diazo compounds · cross-coupling reactions · C–H activation

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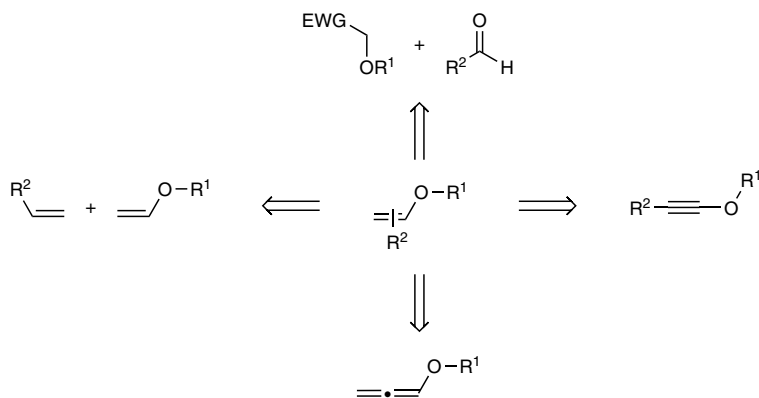
Completely Revised Contributions ·

New

New Contributions

32.5.3.2 **Enol Ethers***F. Bartels, R. Zimmer, and M. Christmann*

In this chapter, recent methods for the preparation and elaboration of enol ethers are summarized. In addition to updates on classical methods, recently developed metal-catalyzed procedures are presented. The relevance of these methods is also demonstrated in the context of natural product synthesis.



Keywords: enol ethers · alkoxyallenes · metathesis · Julia alkenation · Wittig alkenation · Suzuki coupling · heterogeneous catalysis · Diels–Alder cycloaddition · cyclization

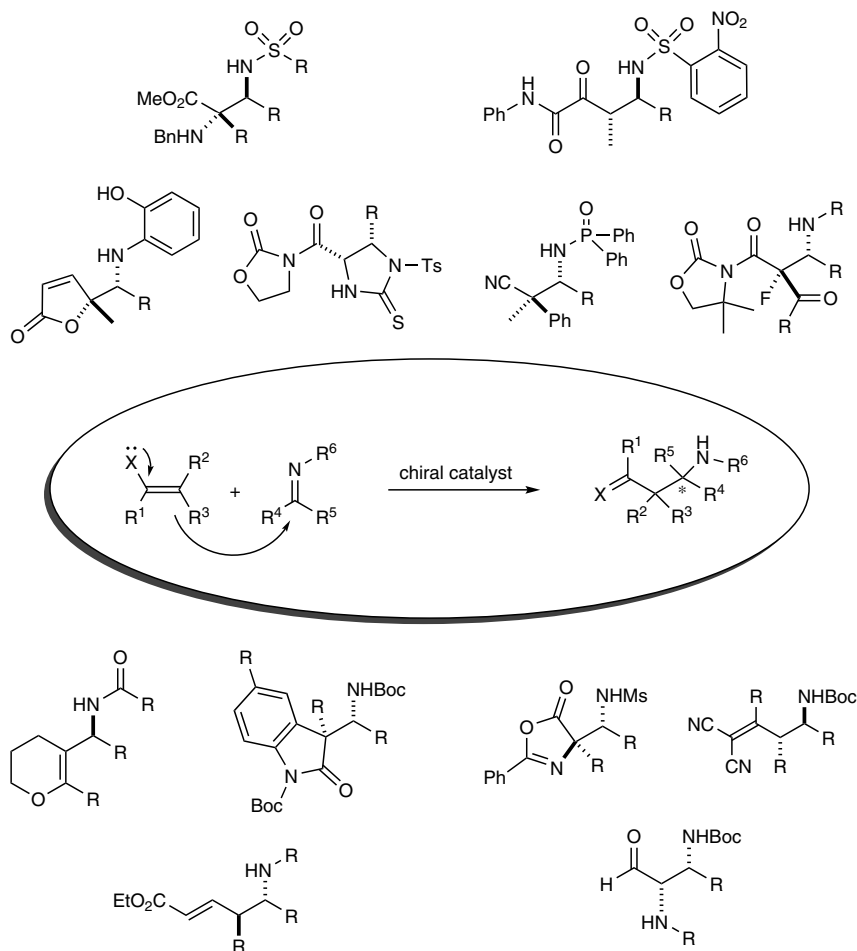
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40.1.1.5.2.4 The Mannich Reaction

C. Schneider and M. Sickert

The Mannich reaction, one of the most fundamental C–C bond-forming reactions, is more than 100 years old and yet is still fascinating. This chapter is an update to the earlier *Science of Synthesis* contribution (Section 40.1.1.5.2) describing methods for the asymmetric synthesis of highly versatile β -amino carbonyl compounds and derivatives via Mannich reaction. This review predominantly focuses on recent developments in catalytic enantioselective and diastereoselective processes of direct, indirect, and vinylogous Mannich reactions using both metal-based catalysts as well as organocatalysts.



Keywords: asymmetric Mannich reaction · asymmetric aminoalkylation · Mannich bases · metal catalysis · organocatalysis · enamine catalysis · Brønsted acid catalysis · hydrogen-bond catalysis · N-heterocyclic carbene catalysis · phase-transfer catalysis · aldimines · ketimines · hydrazones · imine surrogates · enamines · enols · enolates · dienols · dienolates · direct Mannich reaction · indirect Mannich reaction · vinylogous Mannich reaction · Mukaiyama–Mannich reaction · C–C bond formation

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