The Narasaka–Heck Cyclization

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Synthesis of Pyrrole Derivatives by the Heck-Type Cyclization of γ,δ-Unsaturated Ketone O-Pentafluorobenzoyloximes

**Proposed mechanism:**

**Selected examples:**

**Significance:** Based on the finding that palladium(0) can cleave the N–O bond of sulfonyloximes, Tsutsui and Narasaka reported a catalytic protocol coupled with an intramolecular Heck-type cyclization to form pyrroles. Competing Beckmann rearrangement of the oxime derivatives could be suppressed by changing from the sulfonyl- to the pentafluorophenylacyl N-protecting group.

**Comment:** In the following years, this method was successfully extended to access various N-heterocycles (see Review below). An enantioselective version for the synthesis of dihydropyrroles bearing a stereogenic center at the 2-position was introduced by Bower and co-workers (Chem. Sci. 2017, 8, 1981).


**Key words**

amino-Heck cyclization
oximes
palladium catalysis
pyrroles