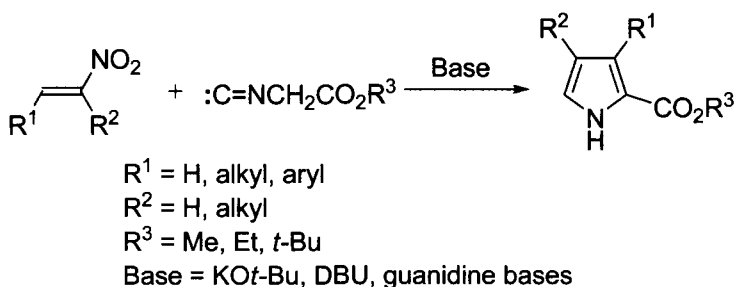


2.3.4 Barton–Zard Reaction

The Barton–Zard reaction refers to the base-induced reaction of nitroalkenes with alkyl α -isocyanoacetates to afford pyrroles.³⁵ Solvents used are THF or alcohols (or mixtures), and the reaction often proceeds at room temperature. The Barton–Zard pyrrole synthesis is similar both to the van Leusen pyrrole synthesis that uses Michael acceptors and TosMIC and to the Montforts pyrrole synthesis that uses α,β -unsaturated sulfones and alkyl α -isocyanoacetates. An alternative to the use of the reactive nitroalkenes is their *in situ* generation from β -acetoxy nitroalkanes, which are readily prepared via the Henry reaction between an aldehyde and a nitroalkane followed by acetylation.



The mechanism is presumed to involve a pathway related to those proposed for other base-catalyzed reactions of isocyanoacetates with Michael acceptors. Thus, base-induced formation of enolate is followed by Michael addition to the nitroalkene and cyclization of nitronate to furnish the nitroisocyanide after protonation. Loss of nitrous acid (HNO_2) and aromatization then affords the pyrrole ester.

