

Abstract

Organometallic species comprising an unsaturated hydrocarbon moiety σ or π -bonded to the metal have long been the focus of both inorganic and organic chemists on account of their rich structural and reactivity aspects. Unsaturated hydrocarbyl groups like allyl, propargyl and allenyl have been proven to contribute immensely to organic synthesis. The fact that such organometallic reagents are tautomeric species, raises the issue of regioselectivity in reactions involving them, and several works that concentrate on the generation and reactivity of such dichotomous species have evolved over the years. To resolve the regiochemical ambiguity arising from the metallotropic rearrangement, factors as diverse as steric hindrance, substitution of the organometallic substrate, solvation and nature of the metal have been studied.

Yet another direction of research focuses on the methods for the *in situ* generation of such organometallic species. In this context, the generation of organostannanes using catalytic transition metal, and subsequent coupling with an organic electrophile in one pot has been well-exploited in recent years. Such a process which does not require scrupulous exclusion of air and water is all the more attractive, both from an operational and environmental point of view.

The thesis entitled “**Synchronizing the Reactivity of Tin(II) and Catalytic Transition Metal Partners: Carbon-Carbon Bond Formation via in-situ Generated Allenyl, Propargyl and Allyl Organometallics**” is primarily an effort towards the development of new synthetic strategies for the formation of carbon-carbon bond by exploiting the reactivity of tin(II) under the aegis of a transition metal catalyst. Efforts have also been made to understand the initial steps in the catalytic cycles. The deliberations are presented in four major chapters.