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Non-conventional green strategies for NHC catalyzed carbon-carbon coupling reactions

[Majid M. Heravi](#)¹, Heidari Bahareh, Ghavidel Mahdieh, Ahmadi Tahereh

¹ Department of Chemistry, Faculty of Physics & Chemistry Alzahra University, Vanak, Tehran, Iran.

Abstract

Background: Coupling reactions, commonly can be achieved via a wide range of organometallic reagents and electrophiles, representing an important class of synthetic transformation, namely cross-coupling reaction. It is frequently catalyzed by various palladium (Pd) as species. The synthesis and characterization of an N-heterocyclic carbene (NHC) was accomplished in 1991. In 1991, the first synthesis of a stable NHC was achieved and reported. **Objective:** This development literally invigorated the interest and attention for this novel species being examined as a ligand for the synthesis of Pd Complexes. **Conclusion:** In this review, we tried to give a full account on the development of NHC–Pd chemistry intended being used as catalyst under non-conventional conditions. In this light, those carbon-carbon bond formations being successfully achieved in aqueous systems, using immobilized NHC-Pd complexes under nonconventional strategies, such as being conducted under microwave irradiations (MWI) are supported and solvent- free conditions are discussed.

Keywords

Aqueous media, Cross-coupling reactions, Green chemistry, Heck reaction, Microwave irradiation, N-heterocyclic carbene (NHC), Pd catalyzed reaction, Suzuki reaction