ABSTRACT

SYNTHESIS OF UNSYMMETRICAL *N*-HETEROCYCLIC CARBENE COMPLEXES AND THEIR CATALYTIC PROPERTIES

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N-heterocyclic carbenes (NHCs) are considered alternatives to phosphine ligand in metal complexes due to strong σ-donor but poor π-acceptor abilities, low toxicity and their stability to air and moisture. Because of these properties of transition metal carbene complexes used as catalyst in many organic reaction. *N*-heterocyclic metal carbene complexes are effective catalysts in many useful transformations, such as C-C and C-N coupling reactions, transfer hydrogenation, olefin metathesis, hydrosilylation, hydroformylation e.t.c.

In this study, a series of unsymmetrical *N*,*N*'-disubstituted imidazolium salts were synthesized as *N*-heterocyclic carbene precursors. These compounds were used to synthesize of *N*-heterocyclic metal (Pd, Ru) complexes. These complexes are classified into three groups, which are donor-functionalized NHC-Pd (**6a,b**) complexes, NHC ligated palladacyclic complexes (**7a-c**) and NHC-Ru complexes (**8a-c**). Due to hemilabil behavior, this study focused on the synthesis of NHC-metal complexes. Catalytic properties of synthesized complexes were investigated in Suzuki-Miyaura cross-coupling reaction and transfer hydrogenation of acetophenone. These new compounds were characterized by analytical method, elemental analysis, ^{1}H- and ^{13}C-NMR spectroscopy. In addition, **6a** numbered structures of the compound has also been characterized by X-ray diffraction.

Key words: N-heterocyclic carbenes (NHCs), imidazolium salts, donor-functionalized, palladacyclic, catalyst, C-C cross-coupling reaction, transfer hydrogenation, X-ray diffraction.