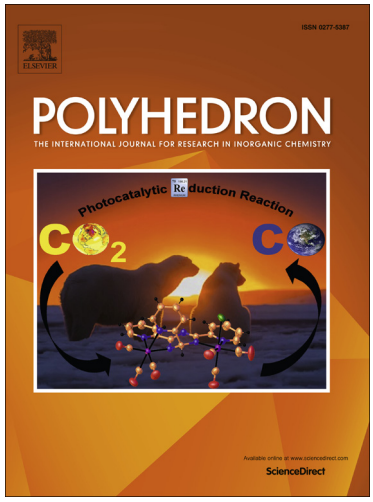

Synthesis, crystal structure study and high efficient catalytic activity of di-μbromo-trans–dibromobis[(benzyl)(4-methylphenyl)(phenyl)phosphine)] di-palladium(II) in Suzuki-Miyaura and Heck-Mizoroki C–C coupling reactions

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PII: S0277-5387(16)30399-0
DOI: http://dx.doi.org/10.1016/j.poly.2016.08.040
Reference: POLY 12177

To appear in: *Polyhedron*

Received Date: 5 August 2016
Revised Date: 24 August 2016
Accepted Date: 24 August 2016

Please cite this article as: A. Ghorbani-Choghamarani, A. Naghipour, H. Babaee, B. Notash, Synthesis, crystal structure study and high efficient catalytic activity of di-μbromo-trans–dibromobis[(benzyl)(4-methylphenyl)(phenyl)phosphine)] dipalladium(II) in Suzuki-Miyaura and Heck-Mizoroki C–C coupling reactions, *Polyhedron* (2016), doi: http://dx.doi.org/10.1016/j.poly.2016.08.040

Synthesis, crystal structure study and high efficient catalytic activity of di-μbromo-trans–dibromobis[(benzyl)(4-methylphenyl)(phenyl)phosphine)] dipalladium(II) in Suzuki-Miyaura and Heck-Mizoroki C–C coupling reactions

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Abstract

The current research aims to present a straightforward synthesis of binuclear palladated triphenylphosphine derivative by the reaction of the phosphonium salt $[(PhCH_2)P(Ph)_2(Ph\text{-}4\text{-}CH_3)]Br$ with palladium(II) chloride and to afford the dimeric palladated complex $\{Pd[P(Ph)(CH_2Ph)(Ph\text{-}4\text{-}CH_3)]((\mu\text{-}Br)Br)\}_2$. Moreover, elemental analysis (CHN), FT-IR, ^1H, ^{31}P, ^{13}C NMR and X-ray crystallography led to the characterization of the obtained compound. Finally, This compound was found to be an efficient catalyst in C-C bond formation between various aryl halides with phenylboronic acid (Suzuki-Miyaura reaction) and aryl halides with n-butyl acrylate (Heck–Mizoroki reaction).

Keywords: Phosphonium salt, Palladium(II) chloride, Suzuki reaction, Heck reaction

1. Introduction

In organometallic chemistry, phosphines have been considered as significant ligands since they have been extensively applied in organic reactions. Phosphine ligands are soft, strong σ-donors and their electronic, steric, and stereo-chemical properties vary based on the multiple substitutes connected to the phosphorus atoms [1-4]. Hence, the correct phosphine for a metal complex needs to be selected in order to influence the electronic and steric environment of the complex. Such a characteristic is most beneficial for maximizing the activity of homogeneous catalysts. Therefore, plenty of phosphine containing homogeneous catalysts has been developed for various organic reactions including hydrogenation, cross couplings, and carbon-hetero atom bond formations [5-8].
Palladium-catalyzed carbon–carbon coupling reactions have been recognized as powerful method and major area of interest in organic synthesis, advanced materials, agrochemicals, pharmaceuticals, herbicides, biologically active compounds, polymers, preparation of

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