

[IL]₂[PdCl₄] complexes (IL = imidazolium cation) as efficient catalysts for Suzuki-Miyaura cross-coupling of aryl bromides and aryl chlorides.

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Rok wydania

2013

Czasopismo

Applied Catalysis A-General

Numer woluminu

466

Strony

216-223

DOI

10.1016/j.apcata.2013.06.046

Kolekcja

Naukowa

Język

Angielski

Typ publikacji

Artykuł

Streszczenie

Palladium complexes of the type [IL]₂[PdCl₄] (IL = imidazolium cation) were found to be very active catalysts for the Suzuki-Miyaura reaction of 2-bromotoluene with phenylboronic acid carried out in 2-propanol or 2-propanol/water at 40 degrees C using normal heating or microwaves as a heating source. In 2-propanol, the highest yields (89% and 85%) were obtained for [dmiop]₂[PdCl₄] and [dmdim]₂[PdCl₄] (dmiop = 1,2-dimethyl-3-propoxymethyl imidazolium cation, dmdim = 3,3'-[1,7-(2,6-dioxaheptane)]bis(1,2-dimethylimidazolium) cation) containing cations substituted at the C2 carbon with a methyl group. In the presence of water, all [IL]₂[PdCl₄] complexes produced ca. 90% of 2-methylbiphenyl. Very good results were also obtained in the Suzuki-Miyaura reaction of different aryl bromides and chlorides. For example, the conversion of 2-chlorotoluene was 71% at 70 degrees C. During the catalytic reaction, the formation of Pd(0) nanoparticles was evidenced by TEM. Mechanistic studies, including Hg(0) tests, showed that Pd(0) nanoparticles acted as a source of catalytically active soluble palladium species.

Słowa kluczowe

palladium, ionic liquids, Suzuki-Miyaura reaction, nanoparticles

Adres publiczny

<http://dx.doi.org/10.1016/j.apcata.2013.06.046>

Strona internetowa wydawcy

<http://www.elsevier.com>