Homogeneous/heterogeneous palladium based catalytic system for Heck reaction. The reversible transfer of palladium between solution and support.

Autorzy

Iweta Pryjomska-Ray

Andrzej Gniewek

Anna M. Trzeciak

Józef J. Ziółkowski

Włodzimierz Tylus

Rok wydania

2006

Czasopismo

Topics in Catalysis

Numer woluminu

40

Strony

173-184

DOI

10.1007/s11244-006-0119-1

Kolekcja

Naukowa

Język

Angielski

Typ publikacji

Artykuł

Streszczenie

Pd(II)/Al2O3and Pd(0)/Al2O3, containing 0.6% of palladium were characterized by EDX, SEM and XRD methods and used ascatalysts of the Heck coupling of bromobenzene with butyl acrylate at 140C in molten [Bu4N]Br salt. Monoarylated (trans-PhCH = CHC(O)OBu) (1) and diarylated (Ph2C = CHC(O)OBu) (2) products were obtained in amounts dependent on kind ofbase present in the system (Scheme 1). During the reaction palladium was partially leached from the support forming [Bu4N][PdBr4]complex that catalyze Heck reaction or undergo readsorption on Al2O3. These soluble palladium complexes are partially reduced toPd soluble nanoparticles which can also be anchored on Al2O3giving active catalyst of Pd(0)/Al2O3type. Reduction of Pd(II) toPd(0) during catalytic process at the presence of bases (NaHCO2, NaHCO3, NaOAc, Cs2CO3) was studied by XPS method and thetotal reduction was observed in reactions of PdCl2(PhCN)2with NaHCO2or with NaHCO3and [Bu4N]Br. It was experimentallyproved that heterogenized catalyst, Pd(0)/Al2O3, after oxidative addition of aryl halides, serve as a source of soluble palladiumspecies and colloidal nanoparticles that are active as homogeneous catalysts.

Słowa kluczowe

Heck reaction, XPS, XRD, SEM, heterogenized catalysts, Pd colloid, Pd nanoparticles.

Adres publiczny

http://dx.doi.org/10.1007/s11244-006-0119-1

Strona internetowa wydawcy

http://link.springer.com