Efficient Click-Polymer-Stabilized Palladium Nanoparticle Catalysts for Suzuki–Miyaura Reactions of Bromoarenes and Reduction of 4-Nitrophenol in Aqueous Solvents


Significance: Triazolyl-PEG polymer-stabilized palladium nanoparticles (PdNPs) were prepared and applied to the Suzuki–Miyaura coupling. The reaction of aryl bromides and phenylboronic acid took place with 0.0001–0.01 mol% Pd of catalyst to give the corresponding products in 90–99% yield. The turnover number (TON) reached up to 990000.

Comment: The Pd(II) catalyst showed lower catalytic activity than the reduced catalyst for the formation of with 0.001 mol% Pd. For a quantitative reaction of 4-bromoacetophenone and phenylboronic acid, 22 hours were needed with catalyst instead of two hours with PdNP catalyst. The average diameter of the Pd nanoparticles of is 1.6 ± 0.3 nm.