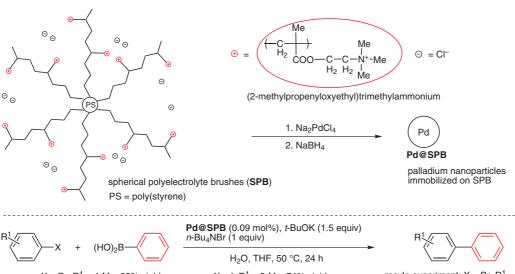
S. PROCH, Y. MEI, J. M. RIVERA VILLANUEVA, Y. LU, A. KARPOV, M. BALLAUFF,* R. KEMPE* (UNIVERSITÄT BAYREUTH AND BASF AG, LUDWIGSHAFEN, GERMANY) Suzuki- and Heck-Type Cross-Coupling with Palladium Nanoparticles Immobilized on Spherical Polyelectrolyte Brushes

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Suzuki-Miyaura Coupling Reaction Using Palladium Nanoparticles Immobilized on SPB



 $X = Br, R^1 = 4-Me; 83\%$ yield $X = Br, R^1 = 4-MeO; 79\%$ yield $X = Br, R^1 = 3-NO_2; 50\%$ yield $X = Br, R^1 = 4-NO_2; 94\%$ yield $X = Br, R^1 = 4-CF_3$; 89% yield

 $X = I, R^1 = 2-Me; 74\%$ yield $X = I, R^1 = 4-Me; 78\%$ yield $X = I, R^1 = 2-MeO; 69\%$ yield $X = I, R^1 = 4-MeO; 83\%$ yield $X = I, R^1 = 4-NO_2; 87\%$ yield $X = I, R^1 = 4-CF_3; 80\%$ yield 1-iodonaphthalene; 71% yield recyle experiment: X = Br, R¹ = H 1st: 79% yield 2nd: 80% yield

3rd: 79% yield 4th: 79% vield

Significance: Palladium nanoparticles immobilized on spherical polyelectrolyte brushes (Pd@SPB) were synthesized and found to promote the Suzuki-Miyaura cross-coupling reaction. Thus, the spherical polyelectrolyte brushes having the (2-methylpropenyloxyethyl)trimethylammonium cation were prepared according to the reported procedures (Y. Mei, G. Sharma, Y. Lu, M. Ballauff Langmuir 2005, 21, 12229). The reaction of SPB with Na₂PdCl₄ followed by reduction with NaBH₄ gave the palladium nanoparticles immobilized in the SPB matrix (Pd@SPB). The Suzuki-Miyaura coupling reaction of aryl halides with phenylboronic acid was carried out in the presence of Pd@SPB (0.09 mol% Pd) in H₂O-THF to give the corresponding biphenyls in good yield (14 examples, 50-94% yield).

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Comment: Recently, the authors have reported the preparation of platinum nanoparticles immobilized on SPB (Pt@SPB), which was found to be an effective catalyst for the reduction of *p*-nitrophenol with NaBH₄. The present report described that the palladium nanoparticles (Pd@SPB) exhibited good activity for the Suzuki-Miyaura coupling reaction. This catalyst was recovered and reused for four times without any loss of catalytic activity. Heck reaction using the palladium nanoparticles (Pd@SPB) was also described.

Category

Polymer-Supported Synthesis

Key words

palladium

Suzuki-Mivaura coupling

Heck reaction

nanoparticles

