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Self-Assembled Poly(imidazole-palladium): Highly Active, Reusable Catalyst at Parts per Million to Parts per Billion Levels


Polymeric Imidazole Pd Catalyst for Cross-Couplings

**Preparation of an imidazole palladium catalyst (MEPI-Pd 3):**

**Allylic arylation–alkenylation of allylic acetates/carbonates:**

![Chemical structure](image)

**The Suzuki–Miyaura coupling:**

![Chemical structure](image)

**Significance:** A self-assembled polymeric palladium catalyst (MEPI-Pd 3) was prepared via the molecular convolution of (NH₄)₂PdCl₄ and poly[(N-vinylimidazole)-co-(N-isopropylacrylamide)]. MEPI-Pd 3 (0.8–40 mol ppm Pd) promoted the allylic arylation/alkenylation of allylic esters 4 with aryl/alkenyloboron reagents 5 in water and/or alcohol to give the corresponding products 6. MEPI-Pd 3 (0.28 mol ppm–0.1 mol% Pd) drove the Suzuki–Miyaura coupling of a variety of aryl chlorides, bromides, and iodides in water to give the corresponding biaryls 7.

**Comment:** MEPI-Pd 3 was reused without loss of catalytic activity for the allylic arylation and the Suzuki–Miyaura coupling. MEPI-Pd 3 with 0.28 mol ppm Pd efficiently promoted the Suzuki–Miyaura coupling of iodotoluene and phenylboronic acid to afford 7b quantitatively with a TON of 3,570,000 and a TOF of 119,000 h⁻¹. The authors reported a preliminary communication for the allylic arylation of allylic acetates (Angew. Chem. Int. Ed. 2011, 50, 9437; Synfacts 2011, 1380).