Pyrene-Tagged Dendritic Catalysts Noncovalently Grafted onto Magnetic Co/C Nanoparticles: An Efficient and Recyclable System for Drug Synthesis


Significance: Pyrene-tagged mono- and penta-phosphine–palladium complexes were immobilized on graphene layers of magnetic Co/C nanoparticles through π–π interactions. The resulting catalysts 1 and 2 were applied to the Suzuki–Miyaura coupling of aryl bromides 1 and boronic acids 2 to afford the corresponding biaryls 3 in 70–98% yield (seven examples). These catalysts were separated from the reaction mixture by magnetic decantation.

Comment: Catalyst 2 was reused ten times without significant loss of catalytic activity (felbinac, 3f, 1st use: 100% GC yield; 11th use: 100% GC yield). ICP-MS analysis for the first cycle showed that about 6% of the introduced palladium leached out into the crude mixture (111 ppm palladium). After the extraction with CH2Cl2, the contamination of palladium became less than 5 ppm, and no traces of cobalt were detected.