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Bis[N , N ′-(2-indanoly)]-1,5-diazacyclooctane as Unique Metal Ligand: Self-Assembly of Palladium Nanoparticles and Catalytic Reactivity on C-C Bond Formation

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Abstract

Copyright © 2017, Georg Thieme Verlag. All rights reserved. A previously unreported 1,5-diazacyclooctane-palladium(II) complex was synthesized using bis[N , N ′-(2-indanoly)]-1,5-diazacyclooctane, which was readily prepared via a novel [4+4] homocyclization of the unsaturated imine intermediate generated from acrolein and 1-amino-2-indanol. Interestingly, the 1,5-diazacyclooctane-palladium(II) complex self-assembled to form palladium nanoparticles. This approach readily provided palladium nanoparticles simply by heating a mixture of palladium(II) acetate and bis[N , N ′-(2-indanoly)]-1,4-diazacyclooctane in dichloroethane at mild temperatures. The 1,5-diazacyclooctane-derivative-palladium nanoparticles were successfully deployed in synthetic applications as a heterogeneous catalyst, facilitating Suzuki coupling and a challenging C-C bond formation via C(sp³)-H activation under low catalyst loading conditions.

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Keywords

1,5-diazacyclooctane, C(sp³)-H activation, chiral ligand, heterogeneous catalyst, palladium nanoparticles, Suzuki coupling