

Novel Pd based catalyst with high performance for Carbon-Carbon coupling reactions

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Abstract

Palladium-catalyzed cross coupling reactions are the most powerful and versatile methods for carbon-carbon bond formation impacting a broad spectrum of the chemical sciences.[1] The C-C coupling reaction could proceed through a homogeneous or heterogeneous catalysis. Homogeneous cross-coupling reactions, however, have several shortcomings such as limited reusability of the expensive catalyst, which impacts cost, and palladium contamination in the product. In order to address these problems, heterogeneous Pd catalysis is a promising option. We therefore propose a novel heterogeneous catalyst based on the immobilization of pre-synthesized Pd nanoparticles on a paper filter (see Figure 1A) which have a low cost and is available in a variety of forms. The catalytic efficiency of the paper based Pd catalyst was tested for the Ullmann cross-coupling reaction (see Figure 1B). The reaction can be followed by UV-visible spectroscopy and provides a convenient reaction to test catalytic systems under representative aerobic reaction conditions. Such kinetic studies allow the most accurate and honest quantification of recovery of catalytic activity

References

[1] L. Yin, J. Liebscher, Chem. Rev. 107, 133, (2007).

Figures

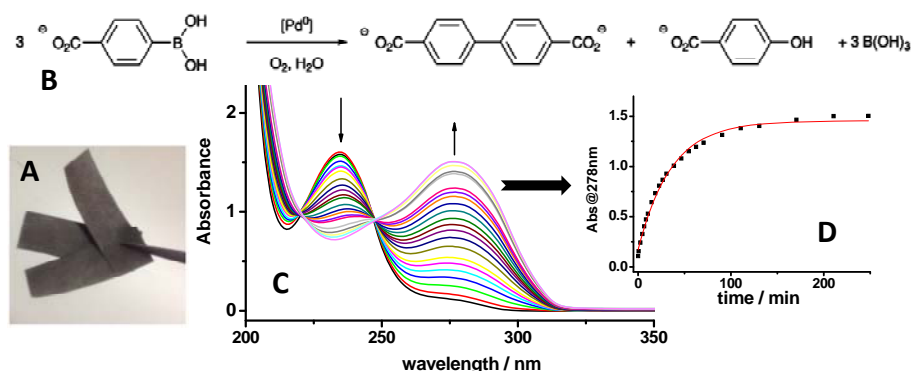


Figure 1. (A) Aqueous aerobic oxidative homocoupling reaction. (B) Photograph of the Pd based catalyst. (C) Time evolution spectra of the reaction. (D) Time variation of absorbance at 278nm.