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## A General Palladium Catalyst for Cross-Coupling Reactions in Deep Eutectic Solvents

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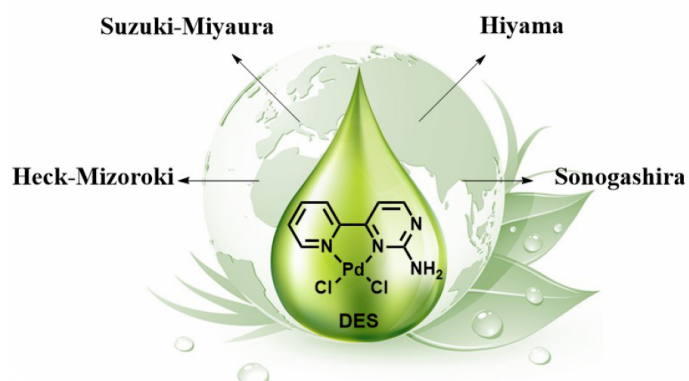
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### PURPOSE OF THE ABSTRACT

Transition-metal catalyzed cross-coupling reactions comprise one of the most important classes of synthetic transformations in modern organic chemistry, providing chemists with an exceptionally powerful tool for the construction of carbon-carbon (C-C) bonds.[1] These methods have been extensively used in both academic and industrial areas including natural product synthesis, material science, pharmaceutical and fine chemicals. Lifecycles analyses of pharmaceutical processes have shown that volatile organic solvents make up the bulk of waste that is produced. Much of the effort to decrease the environmental impact of cross-coupling reactions has focused on using more benign solvents such as Deep Eutectic Solvents (DESs).[2] The most used DESs are formed from mixtures of solid Brønsted or Lewis acids and bases, which form liquids product. These mixtures have very low inflammability, volatility and price, together with good availability. Many DESs components come from natural sources and display low toxicity, high biodegradability and renewability. All these factors highlight the broad potential of DESs as substituents for hazardous organic solvents, both making organic synthesis more sustainable and reducing its negative impact on the environment. Nevertheless, the use of DESs as reaction medium in organic synthesis is in its childhood, with very few reports of related metal-catalyzed reactions,[3] and the possible jump of DESs to industry being an blue ocean.

The catalyst also provides an opportunity to enhance the sustainability of these processes. Although much effort have been devoted to the design of optimal ligands to provide high-actively cross-coupling catalysts, the ligand adds to the cost of the system and increases the amount of waste material produced. Nitrogen-based ligands have received less attention than phosphines or NHCs in palladium-catalyzed cross-coupling reactions. However, the lower cost of nitrogen-based ligands compared with phosphines make them attractive alternative systems. In this communication, a bipyridine-palladium complex has been successfully applied as a general catalyst to different cross-coupling reactions (Heck-Mizoroki, Suzuki-Miyaura, Hiyama and Sonogashira) with a great compatibility in DESs due to its intrinsic capacity of hydrogen bond formation.[4]

## FIGURES



### FIGURE 1

Figure 1  
Figure 1

### FIGURE 2

## KEYWORDS

Deep Eutectic Solvents | Sustainable Chemistry | Cross Coupling | Palladium

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