

# Suzuki and Heck reactions promoted by an ionically-tagged palladium complex

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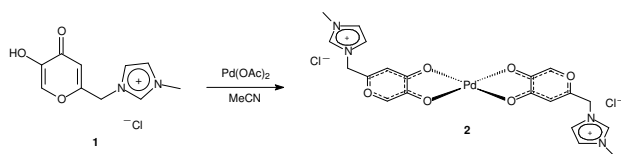
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## INTRODUCTION

Ionic liquids (ILs) are regarded as a great media for organometallic catalysis. It has been recently reviewed that the use of modified catalysts, which incorporate an ionic tag such as the imidazolium ring, may comprise a promising solution for the problem of catalyst leaching.<sup>1</sup> In this sense, we describe herein a novel ionically-tagged palladium catalyst and its application in C-C bond formation.

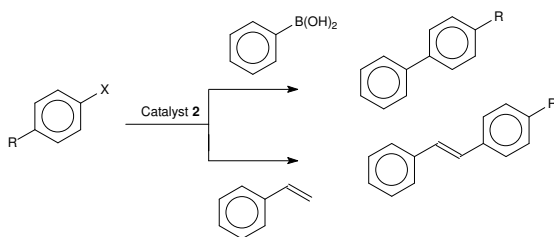
## RESULTS AND DISCUSSION

The novel ionically-tagged palladium complex was synthesized as described in Scheme 1.



**Scheme 1.** Synthesis of the ionically-tagged palladium complex.

The palladium catalyst was applied in Suzuki and Heck reactions of several aryl halides (Scheme 2).



**Scheme 2.** Suzuki coupling and Heck arylation promoted by palladium catalyst 2.

Table 1 shows some results for the Suzuki and Heck reactions under different conditions. All yields in DMF were excellent, both Heck and Suzuki reactions. Nevertheless, the use of ILs gave only modest yields. Studies are underway in order to optimize yields in ILs and carry out recycling reactions.

**Table 1.** Yields for the Suzuki and Heck reactions.

Entry	ArX	Reaction*	medium	Yield(%)
1	4-	Suzuki	DMF	85
2	4-	Suzuki	DMF	76
3	PhI	Suzuki	DMF	100
4	PhBr	Suzuki	DMF	100
5	4-NO <sub>2</sub> PhI	Suzuki	DMF	100
6	4-	Suzuki	DMF	100
7 <sup>a</sup>	4-	Suzuki	DMF	100
8	4-	Suzuki	BMI·BF <sub>4</sub> <sup>b</sup>	22
9	4-	Suzuki	BMI·BF <sub>4</sub> <sup>b</sup>	35
10	4-	Suzuki	BMI·BF <sub>4</sub> <sup>b</sup>	50
11	4-	Heck	DMF	100
12	4-	Heck	DMF	98
13	PhI	Heck	DMF	100
14	PhBr	Heck	DMF	97
15	4-NO <sub>2</sub> PhI	Heck	DMF	100
16	4-	Heck	DMF	100
17	PhI	Heck	BMI·BF <sub>4</sub>	10
18	4-	Heck	BMI·BF <sub>4</sub> <sup>c</sup>	40
19	PhI	Heck	BMI·BF <sub>4</sub> <sup>d</sup>	54
20	4-	Heck	BMI·BF <sub>4</sub>	25

\*Suzuki conditions: Phenylboronic acid, catalyst 2 (1 mol%), K<sub>3</sub>PO<sub>4</sub>, 3h, 130°C; Heck conditions: Styrene, catalyst 2 (1 mol%), NaOAc, 24 h, 110°C.<sup>a</sup> with NBu<sub>4</sub>Br. <sup>b</sup> MeOH added into the reaction. <sup>c</sup> 5 mol% of catalyst 2. <sup>d</sup> 10 mol% of catalyst 2.

As depicted from Table 1, it is promising the use of ILs as a media to perform these reactions.

## CONCLUSION

A novel ionically-tagged palladium catalyst was synthesized and successfully applied in the Suzuki and Heck reactions. Furthermore, the use of ILs allows the recovery of catalytic system.

## ACKNOWLEDGEMENTS

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## REFERENCES

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