Cross-Coupling Reaction of Organotellurolates with Aryl Iodides Catalyzed by CuI

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INTRODUCTION

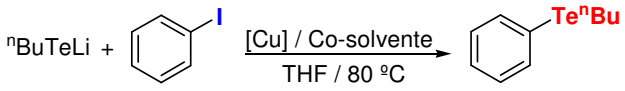
Transition metal catalyzed cross-coupling reactions of organic electrophiles and organometallic reagents allows the formation of new carbon-carbon and carbon-heteroatom bonds.[1] Several catalytic systems have been developed for the formation of C-N, C-O, and C-S bonds. However, very few reports on the formation of C-Te bonds by this process are available.[2]

In this work, we report the synthesis of aryl alkyl tellurides by the reaction of aryl iodides with lithium alkyltellurolates promoted by CuI.

RESULTS AND DISCUSSION

Initially, we studied the influence of the copper reagents and the presence of co-solvents to determinate the best conditions for the cross-coupling reaction (Table 1). For this purpose, we choose the lithium *n*-butyltellurolate (**1a**) to react with phenyl iodide (**2a**).

Table 1. Optimization of the reaction conditions.



1a **2a** **3a**

Entry	[Cu] (5 mol %)	Co-solvent (1 mL)	Yield. (%)*
1	---	---	25
2	CuI	---	48
3	CuI	DMSO	85
4	CuI	Dioxane	56
5	**CuI**	**DMF**	**94**
6	CuBr	DMF	82
7	$CuSO_4$	DMF	48
8	CuCN	DMF	80
9	$Cu(OAc)_2$	DMF	77

* Isolated yields.

In Table 1 we can see that the reaction performed in THF in the absence of a catalyst gave the product in 25%. Under the same conditions, but in the presence of 5 mol% of CuI, the yield was 48%. The addition of DMF as a co-solvent raised the yield to 94%. Other solvents and copper salts were also employed, but with inferior results as can be observed in Table 1.

Having determined the best reaction conditions, we investigated the influence of the aryl iodide nature in the reaction yield (Figure 1).

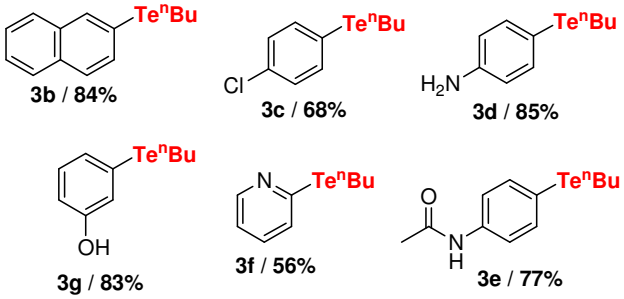


Figure 1. Cross-coupling reaction with others aryl iodides.

The influence of the lithium organotellurolates in the reaction course was also studied. Use of lithium methyl-, ^{s}butyl and ^{t}butyltellurolate under the standard conditions led to the products in good yields, 80, 84 and 75 %, respectively. Lithium aryltellurolates did not react with phenyl iodide. Instead, the diaryltelluride corresponding to the lithium aryltellurolate contaminated with the corresponding diaryldittelluride was formed.

CONCLUSION

In conclusion, we have developed a mild catalytic method to prepare functionalized aryl alkyl tellurides, which is compatible with a number of functionalities. At last but not least, we mention that the prepared compounds are not bad smelling, and when are solvent free they can be safely handled in the presence of light and air.

ACKNOWLEDGEMENTS

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[2] Beletskaya, I. P.; Ananikov, V. P. *Chem. Rev.* **2011**, *111*, 1596-1636.