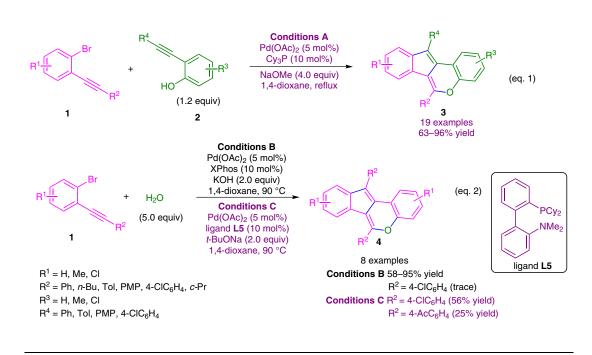
X. PAN, H. NIE, Y. LUO, Y. GAO,* J. WU* (FUDAN UNIVERSITY, SHANGHAI, SHANGHAI UNIVERSITY OF T.C.M. AND SHANGHAI INSTITUTE OF ORGANIC CHEMISTRY, P. R. OF CHINA)

Facile Assembly of Indeno[1,2-*c*]chromenes via a Palladium-Catalyzed Reaction of 2-Alkynylhalobenzene *Org. Biomol. Chem.* **2012**, *10*, 8244–8250.

Pd-Catalyzed Synthesis of Indeno[1,2-c]chromenes from 2-Alkynylhalobenzenes



Significance: Reported is the synthesis of indeno[1,2-c]chromenes 3 and 4 via a palladiumcatalyzed reaction of 2-alkynylbromobenzenes 1 with either 2-(2-arylethynyl)phenols 2 or with water. A range of ligands was used during the optimization study to reveal that the reaction proceeds only with Cy₃P as ligand (eq. 1). Sodium methoxide in toluene or 1,4-dioxane was better than other combinations. The substrate scope of this transformation was modestly demonstrated. The reaction also proceeded to give **3** in 78% yield by treatment of 1-chloro-2-(2-phenylethynyl)benzene with **2** ($\mathbb{R}^3 = \mathbb{H}$, $\mathbb{R}^4 = \mathbb{P}h$). Surprisingly, re-optimization was required in the reaction of 1 with water (eq. 2). Both alkyl- and aryl-substituted alkynes were tolerated under the optimized conditions. However, the reaction parameters had to be rescreened to give a satisfactory yield of compounds with electron-withdrawing groups ($R^2 = 4$ -ClC₆H₄, 4-AcC₆H₄).

SYNFACTS Contributors: Victor Snieckus, Suneel P. Singh Synfacts 2013, 9(1), 0031 Published online: 17.12.2012 **DOI:** 10.1055/s-0032-1317868; **Reg-No.:** V15212SF

2013 © THIEME STUTTGART • NEW YORK

Comment: The [6.5.6.6]-tetracyclic core of indenochromenes 3 and 4 is present in several bioactive compounds (B. S. Min et al. Bioorg. Med. Chem. Lett. 2012, 22, 7436). Very few synthetic methods such as iron-mediated [3+2]-annulation reactions are available to provide access to this tetracyclic system (Z.-Q. Wang et al. Org. Lett. 2011, 13, 14). The present method provides a rapid construction of various substituted indenochromenes from easily accessible starting materials. One drawback of this method is the lower yield for electron-poor substrates. Although, this work provides a facile synthesis of indeno[1,2-c]chromenes, it is strikingly similar to the authors' previous work (Y. Luo, L. Hong, J. Wu Chem. Commun. 2011, 47, 5298).

Category

Synthesis of Heterocycles

Key words

indeno[1,2-c]chromenes

2-alkynylbromobenzenes

2-(2-phenylethynyl)phenols

palladium catalysis