

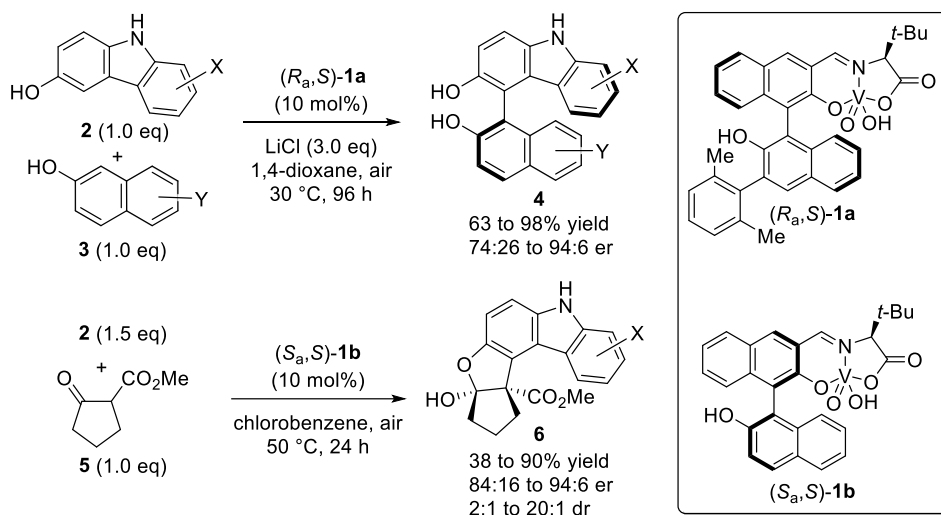
Chemo- and Enantioselective Hetero-coupling of 3-Hydroxycarbazoles Catalyzed by a Chiral Vanadium(V) Complexes

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Optically active biarenol derivatives have played a significant role in asymmetric synthesis because of their high potential as chiral reagents and building blocks. Our group has previously reported a chiral vanadium(V) complex-mediated enantio- and regioselective oxidative homo-coupling reactions of monocyclic and polycyclic phenols including heterocycles to produce the axially chiral biarenols.¹

Herein, we report the first chiral vanadium(V) complex catalyzed oxidative shetero-couplings using 3-hydroxycarbazoles **2**. Chiral vanadium catalyst (*R_a,S*)-**1a**^{2,3} was found to promote the coupling of **2** (1.0 eq) with 2-naphthols **3** (1.0 eq) under mild reaction conditions, affording the hetero-coupling products **4** without any formation of the corresponding homo-coupling products. In this presentation, highly chemo- and stereoselective cross-dehydrogenative couplings⁴ of **2** and β -ketoester **5** utilizing chiral vanadium catalyst (*S_a,S*)-**1b** will also be discussed.



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