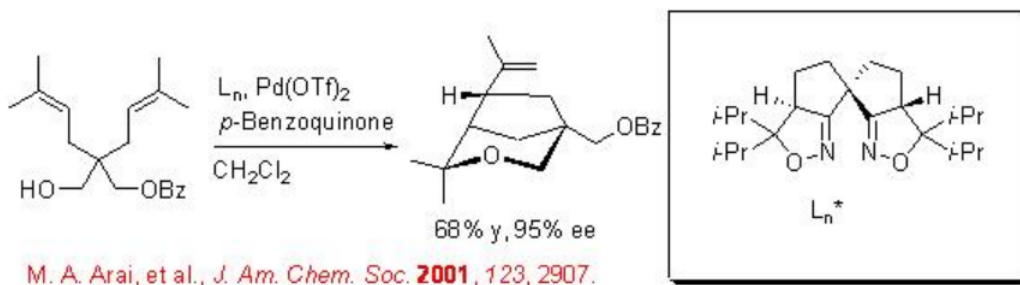


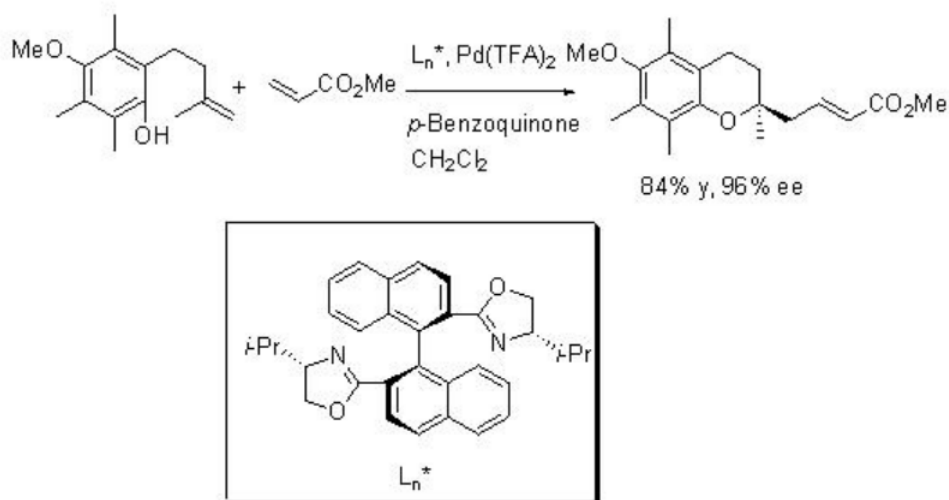
4.5: Oxidation Reactions

Wacker-type tandem cyclization reaction of alkenyl alcohol is reported using chiral palladium(II)-spirobis(isoxazoline) with excellent enantioselectivity (Scheme 4.5.1). In this reaction, benzoquinone reoxidizes the reduced palladium(0) to palladium(II) species to complete the catalytic cycle.



Scheme 4.5.1

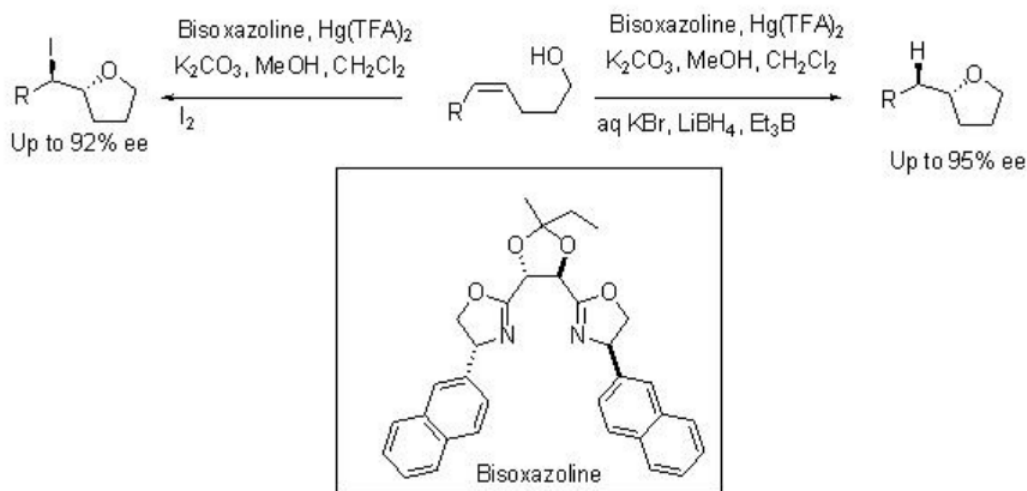
Palladium complex derived from $\text{Pd}(\text{TFA})_2$ and (*S,S*)-BOXAX has been found to be effective for the synthesis of chiral chroman framework in the presence of benzoquinone (Scheme 4.5.2).



L. F. Tietze, et al., *Angew. Chem. Int. Ed. Engl.* **2005**, 44, 257.

Scheme 4.5.2

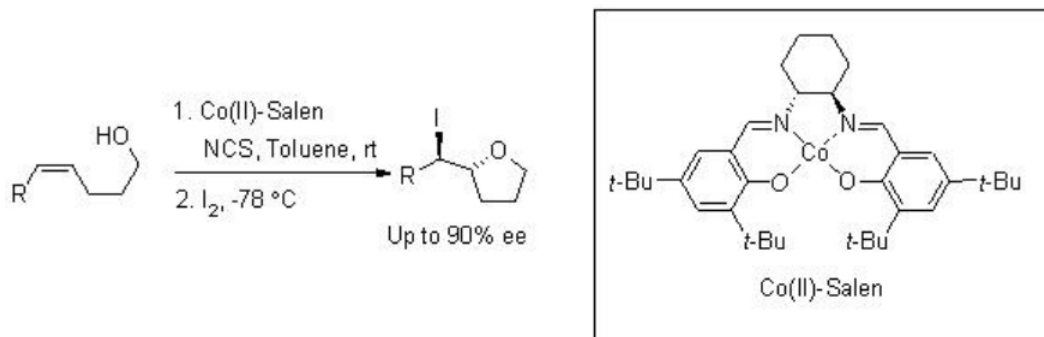
The mercury(II) complex derived from $\text{Hg}(\text{TFA})_2$ and bisoxazoline has been used for the mercuriocyclization with high enantioselectivity (Scheme 4.5.3).



S. H. Kang, M. Kim, *J. Am. Chem. Soc.* **2003**, 125, 4684.

Scheme 4.5.3

Chiral cobalt(II)-salen has been used for the enantioselective intramolecular iodoetherification to procure 2-substituted tetrahydrofurans with up to 90% ee (Scheme 4.5.4).



R	Yield [%]	ee [%]
(CH ₂) ₃ Ph	94	84
Me	96	67
Et	89	82
n-Pr	85	85
i-Pr	83	73
(CH ₂) ₃ OTr	89	90

S. H. Kang, et al., *J. Am. Chem. Soc.* **2003**, 125, 15748.

Scheme 4.5.4

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