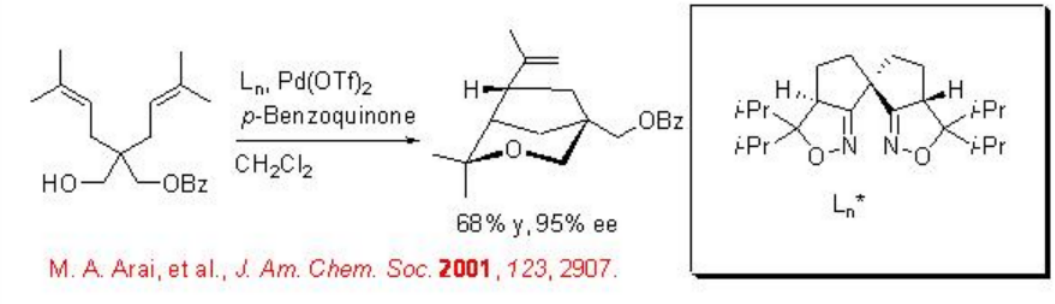
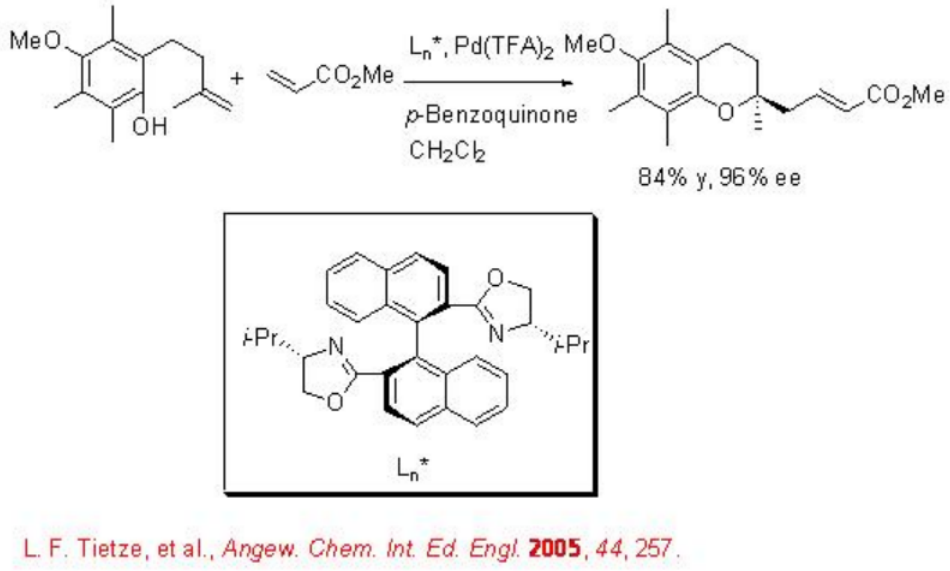
4.5: Oxidation Reactions

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.



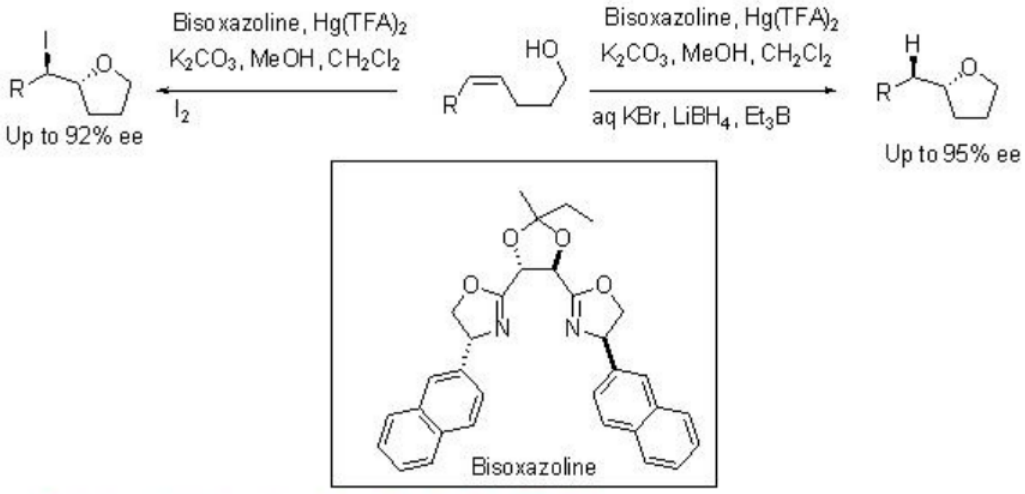
Scheme 4.5.1

Palladium complex derived from $Pd(TFA)_2$ 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).



Scheme 4.5.2

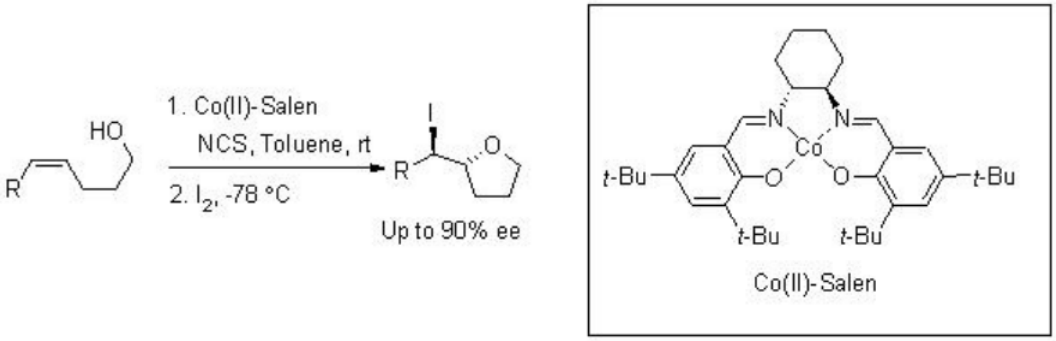
The mercury(II) complex derived from $Hg(TFA)_2$ and bisoxazoline has been used for the mercuriocyclization with high enantioselectivity (Scheme 4.5.3).



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 [%]
$(CH_2)_3Ph$	94	84
Me	96	67
Et	89	82
n-Pr	85	85
i-Pr	83	73
$(CH_2)_3OTr$	89	90

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

Scheme 4.5.4