

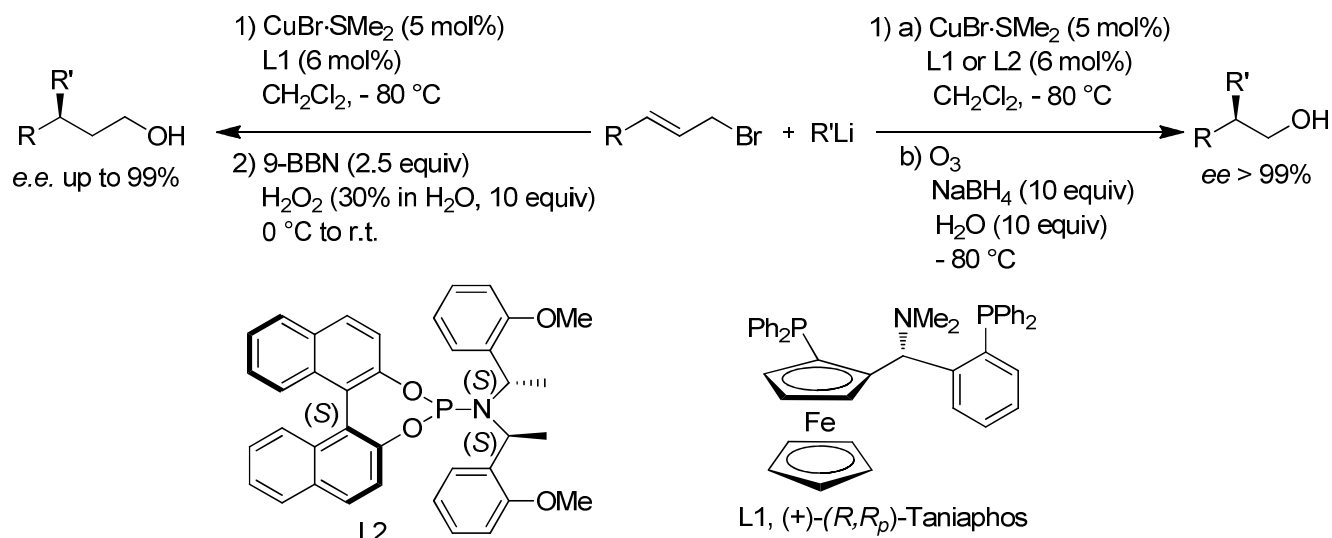
# Synthesis of Optically Active $\beta$ - or $\gamma$ -Alkyl Substituted Alcohols through Copper-Catalyzed Asymmetric Allylic Alkylation with Organolithium Reagents

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Optically active  $\beta$ - or  $\gamma$ -alkyl substituted primary alcohols are key intermediates in total synthesis of natural products. Several methodologies have been developed for the construction of these building blocks based on chiral auxiliaries,<sup>1</sup> resolution methods,<sup>2</sup> etc. However the development of a catalytic asymmetric protocol is still challenging for the synthesis of these alcohols. Recently our group reported the first Cu-catalyzed asymmetric allylic alkylation (AAA) with highly reactive organolithium reagents with excellent regio- and high enantioselectivity.<sup>3,4</sup> Herein we report the combination of Cu-catalyzed AAA and reductive ozonolysis in one pot protocol to afford optically active  $\beta$ -alkyl substituted alcohols and in combination of Cu-catalyzed AAA with a hydroboration oxidation reaction to achieve optically active  $\gamma$ -alkyl substituted alcohols.



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