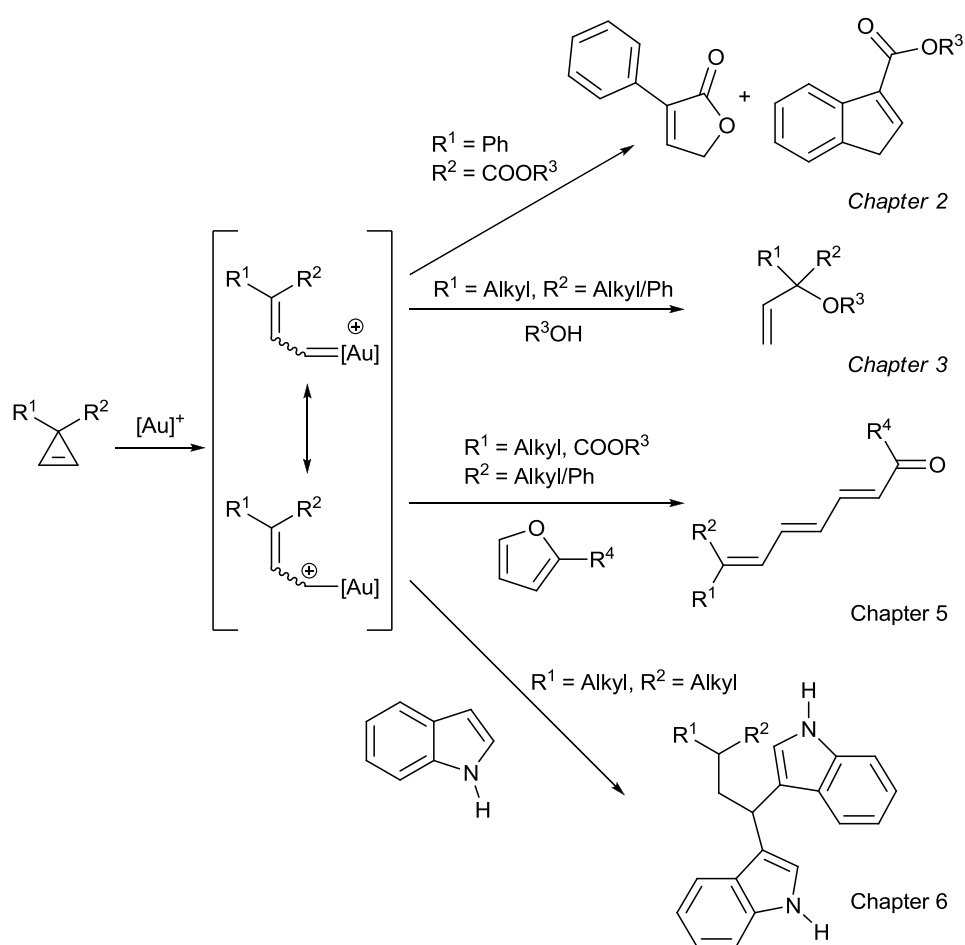


Chapter 7 - Conclusions

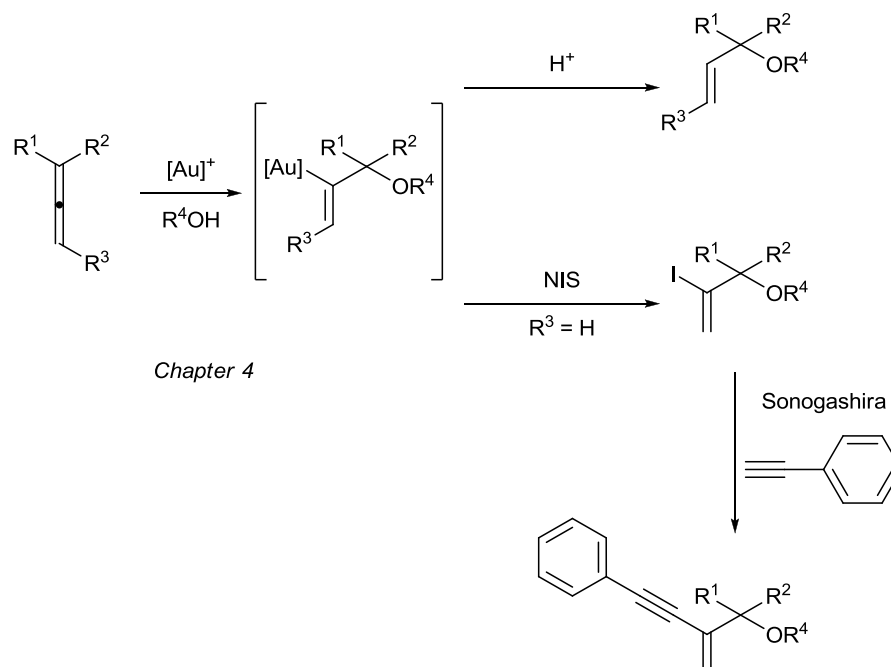
At the beginning of this PhD project (October 2007) there were relatively few publications on gold(I)-homogenous catalysis (as outlined in chapter one) and there was not any literature describing gold(I)-catalysis with cyclopropenes. Since then, we have been able to demonstrate that gold(I) can activate the π -bond on the cyclopropene, inducing ring opening and allowing a variety of nucleophiles to attack. The general reaction we developed enabled the generation of a plethora of exciting products, most of which have proven difficult to synthesise *via* alternative routes (Scheme 1).



Scheme 1 Gold(I)-Catalysed Nucleophilic Additions to Cyclopropenes

During our studies, the gold(I)-catalysed hydroalkoxylation of allenes had been reported giving primary alkyl allylic ethers as products (Chapter 4). We felt that using knowledge gained from the alcohol addition reaction with cyclopropenes, we might be able to achieve regioselective formation of tertiary alkyl allylic ethers instead. Upon

successful optimisation of the reaction conditions, we managed to completely switch the regioselectivity to produce only tertiary allylic ethers. Furthermore, to increase the functionality of the tertiary allylic ether, we were able to trap the vinyl gold intermediate with NIS and perform a Sonogashira cross coupling reaction (Scheme 2).



Scheme 2 Gold(I)-Catalysed Hydroalkoxylation of Allenes With and Without Trapping to Give Tertiary Alkyl Allylic Ethers

Future work in this area includes advancing and developing asymmetric gold(I)-catalysed reactions. There is great potential in this area as while using a gold(I)-catalyst with chiral ligands to perform the alcohol addition to cyclopropenes we were able to achieve 22% ee (Chapter 3). Further optimization of this reaction could potentially provide a useful way of generating enantiopure tertiary allylic ethers.