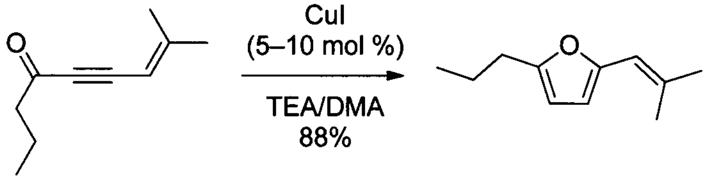
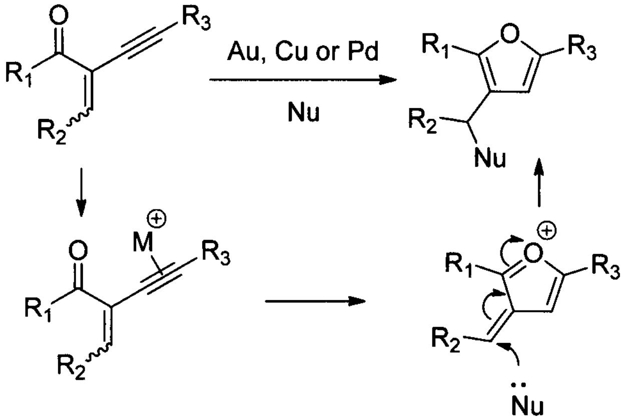
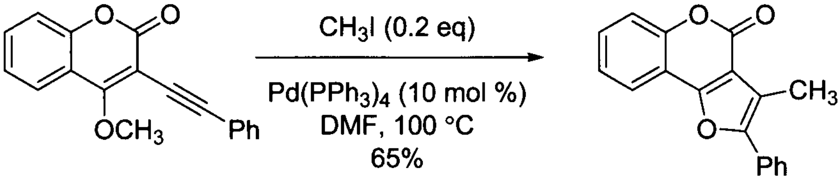


A number of cycloisomerization reactions involving α,β-unsaturated propargyl ketones have also been employed in the synthesis of substituted furans. These reactions are generally catalyzed by either gold(III) or copper(I), and are believed to proceed through an oxonium ion intermediate, which is subsequently trapped by a nucleophile as illustrated below.



Monteiro and co-workers recently used this approach in their synthesis of 2,3-disubstituted furocoumarins.[49] These compounds have proven to be important functional components with a host of interesting biological properties. Cycloisomeratization of 4-methoxy-3-(phenylethynyl)-2*H*-chromen-2-one with methyl iodide in the presence of palladium tetraphenylphosphine in DMF gave the corresponding 2-aryl-3-alkyl furocomarin in modest yield. This approach was also employed by Cheng and Hu in their synthesis of substituted furocoumarins.[50]



Metal-catalyzed cyclization/conjugate addition sequences involving substituted propargyl epoxides have also been employed in the synthesis of highly functionalized furans. These reactions are generally catalyzed by