ORGANOCATALYTIC ASYMMETRIC HALOCYCLIZATION OF ALLYLIC AMIDES TO CHIRAL OXAZOLINES USING DTBM-SEGPHOS-MECHANISTIC IMPLICATIONS FROM HAMMET PLOTS

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The halocyclization of alkenes possessing an internal heteroatom nucleophile leads to multifunctional heterocycles which are useful versatile intermediates in organic synthesis. The asymmetric chlorocyclisation of 2-substituted allylic amides gives access to chiral oxazolines bearing a chloromethyl moiety for further synthetic manipulation. Literature reports on this transformation involve complex syntheses of the 2-substituted allylic amides substrates and cryogenic temperatures for achieving high enantioselectivities in the organocatalyzed halocyclization step. Based on a regioselective Heck reaction of aryl bromides and Boc-protected allylamine or allylamine benzamides, we developed a practical synthesis of 2-substituted allylic amides that does not require chromatography and in the subsequent asymmetric halocyclization we achieved up to 92%ee under practical conditions (5 ^{o}C, CpME) using (S)-(+)-DTBM-SEGPHOS as the catalyst. In addition, using appropriately substituted substrates, we generated Hammett plots and formulated consistent mechanisms for the halocyclization reaction which involve two competing modes depending on the p*K*a of the amide functionality and the electronic stabilisation of the intermediate haliranium intermediate.

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