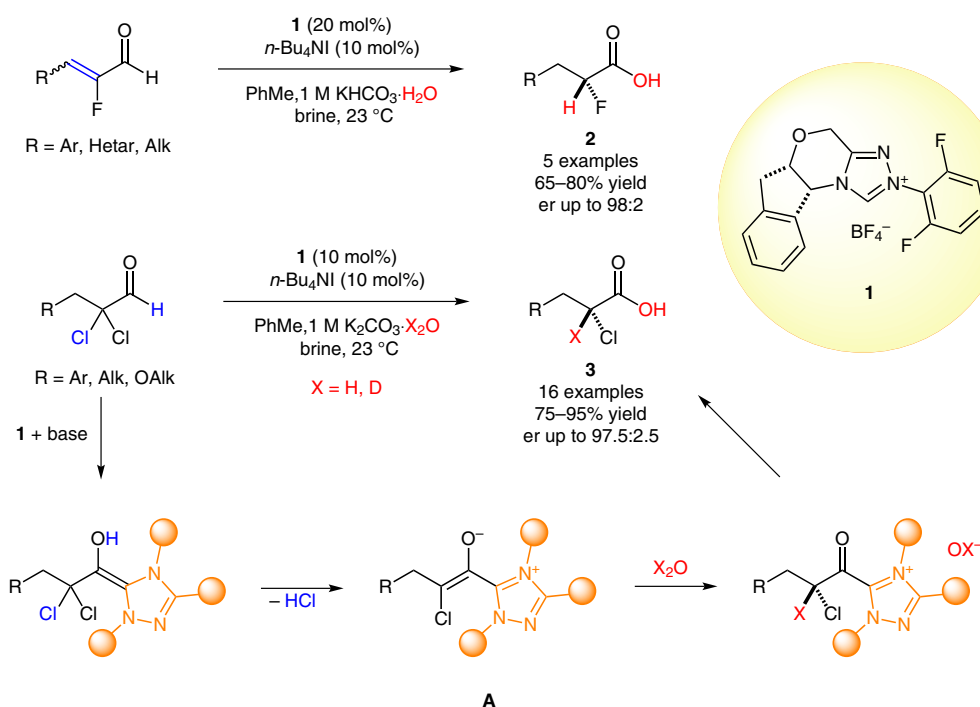


Asymmetric Synthesis of α -Halo Carboxylic Acids from α,α -Dihalo Aldehydes



Significance: The enantioselective hydration of α,α -dichloro aldehydes and α -fluoro enals catalyzed by N-heterocyclic carbene **1** has been reported. α -Fluoro and α -chloro carboxylic acids **2** and **3** were obtained in good yields with high enantioselectivity. The developed reaction enables incorporation of an α -deuterium to give rise to enantioenriched α -deutero α -halo acids using D₂O as the deuterium source.

Comment: Enantioenriched α -halo carbonyls are valuable synthetic intermediates. Current approaches to these compounds rely on the asymmetric generation of α -halo aldehydes or esters. Rovis and colleagues previously demonstrated that chiral N-heterocyclic carbene catalyzes the enantioselective reaction of α,α -dichloro aldehydes and phenol leading to α -chloro aryl esters (N. T. Reynolds, T. Rovis *J. Am. Chem. Soc.* **2005**, *127*, 16406). This approach is based on the enantioselective protonation of catalytically generated chiral enolates **A**. Utilizing the same principle and employing water as the nucleophile instead of phenol enabled a direct approach to α -halo carboxylic acids.