Ruthenium-Catalyzed Asymmetric Photocycloaddition of 2′-Hydroxychalcones

Significance: A chiral scandium–ligand complex was shown to catalyze triplet energy transfer from an electronically excited photosensitizer. This strategy can be applied to the asymmetric [2+2] photocycloaddition of 2′-hydroxychalcones and dienes with tris(bipyridyl)ruthenium(II) as a sensitizer.

Comment: This protocol permits ready access to chiral [2+2] cycloadducts bearing three contiguous stereocenters in good yields and with high enantioselectivities. Several lines of evidence support a mechanism in which the coordination of the scandium catalyst dramatically lowers the triplet energy of the 2′-hydroxychalcone.