Regioselective Chromatic Orthogonality with Light-Activated Metathesis Catalysts

The ability to selectively guide consecutive chemical processes towards a preferred pathway by using light of different frequencies is an appealing concept. We describe the coupling of two photochemical reactions, one the photoisomerization and consequent activation of a sulfur-chelated latent olefin-metathesis catalyst at 350 nm, and the other the photocleavage of a silyl protecting group at 254 nm. Depending on the steric stress exerted by a photoremovable neighboring chemical substituent, we demonstrate the selective formation of either five- or six-membered-ring frameworks by light-triggered ring-closing metathesis. The orthogonality of these light-induced reactions allows the initiation of these processes independently and in interchangeable order, according to the wavelength of light used to promote them.