Diversity-Oriented Synthesis of Heterocycles and Macrocycles by Controlled Reactions of Oxetanes with α-Iminocarbenes

Alejandro Guarnieri-Ibáñez, Florian Medina, Céline Besnard, Sarah L. Kidd, David R. Spring, Jérôme Lacour

a Department of Organic Chemistry, University of Geneva, Geneva, Switzerland
b Laboratory of Crystallography, University of Geneva, Geneva, Switzerland.
c Department of Chemistry, University of Cambridge, Cambridge, UK.
Alejandro.Guarnieri@unige.ch

N-Sulfonyl-1,2,3-triazoles are known to decompose under metal catalyzed reaction conditions leading to electrophilic α-imino carbenes. These intermediates undergo many original processes, from cyclopropanations to ylide forming reactions and subsequent transformations.

Herein, we report the Rh(II)-catalyzed reaction of sulfonyl triazoles 1 with oxetanes 2. Depending on reaction conditions or substrate selection, 2-imino tetrahydrofurans 3, 13-membered sulfonimidates 4 and 15-membered aza-macrocycles 5 are generated selectively via formal [1+4], [5+4+4] and [3+4+4+4] condensations of α-imino carbenes and oxetanes, respectively. Straightforward syntheses of spiro N-heterocycles such as indoline 6 and tetrahydroquinoline 7 are achieved by means of Buchwald-Hartwig and Pictet-Spengler cyclizations, completing effectively the product diversity.