

1,3 DIPOLAR CYCLOADDITIONS OF AZIDES ON ENAMINES: MORE THAN 50 YEARS IN A “CLICK”

Emanuela Erba, Alessandro Contini, Sara Pellegrino, Donato Pocar

Dipartimento di Scienze Farmaceutiche, Sezione di Chimica Generale e Organica "A. Marchesini", Università degli Studi, Milano-Italy

Pioneering studies on “click” 1,3 dipolar cycloaddition of azides on enamines were reported in the early sixties¹, although the mechanism has been completely clarified only recently². Depending on the nature of the azide reactant, the triazole cycloadduct can be isolated or can quickly decompose to other products. In this last case, the starting enamine drives the rearrangement to amidines (Paths A and B, Figure 1) or α -amino-imino compounds (Path C, Figure 1).

During the years, this synthetic approach led to different classes of compounds (e. g. nitrogen containing heterocycles, enantiopure carboxylic acids, diazoalkanes, chiral cyclic diamines)³ used in a wide range of applications, from bioactive compounds to hybrid homogenous catalysts⁴. Here, the advances on this click reaction are presented.

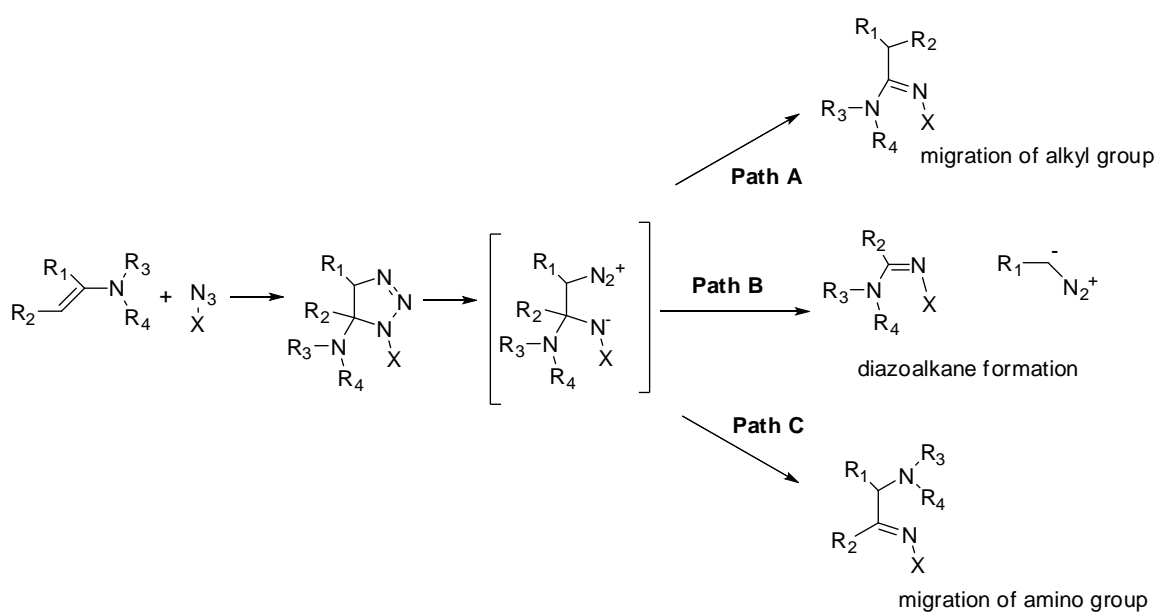


Figure 1

(1) R. Fusco, G. Bianchetti, D. Pocar *Gazz. Chim. Ital.*, **1961**, *91*, 933–957.

(2) a) S. Xie et al *JACS* **2015**, *137*, 2958-2966; b) A. Contini, E. Erba *RSC Advances* **2012**, *2*, 10652–10660.

(3) a) S. Pellegrino, A. Contini, M. L. Gelmi, L. Lo Presti, R. Soave, E. Erba *J. Org. Chem.* **2014**, *79*, 3094-3102; b) A. Contini, E. Erba, S. Pellegrino *Synlett* **2012**, *23*, 1523-1525, c) E. Erba, D. Pocar, P. Trimarco

Synthesis **2006**, 2693-2696, d) F. Cassani, E. Erba, G. Celentano, D. Pocar *Synthesis* **2004**, 1041-1046 e) E. M. Beccalli, A. Contini, P. Trimarco *Eur. J. Org. Chem.* **2003**, 3976-3984.

(4) a) S. Pellegrino, N. Tonali, E. Erba, J. Kaffy, M. Taverna, A. Contini, M. Taylor, D. Allsop, M. L. Gelmi, S. Ongeri *Chem. Science* **2017**, *8*, 1295-1302; b) S. Pellegrino, G. Facchetti, A. Contini, M. L. Gelmi, E. Erba, R. Gandolfi, I. Rimoldi *RSC Advances* **2016**, *6*, 71529–71533.