Zinc-catalyzed cycloisomerizations. Synthesis of substituted furans and furopyrimidine nucleosides.

Autorzy

A. Sniady

A. Durham

M. S. Morreale

Andrzej Marcinek

Sławomir Szafert

Tadeusz Lis

K. R. Brzezińska

T. Iwasaki

T. Ohshima

K. Mashima

Roman Dembiński

Rok wydania

2008

Czasopismo

Journal of Organic Chemistry

Numer woluminu

73

Strony

5881-5889

DOI

10.1021/jo8007995

Kolekcja

Naukowa

Streszczenie

5-*Endo-dig* cycloisomerization of 1,4- and 1,2,4- mostly aryl-substituted but-3-yn-1-ones in the presence of a catalytic amount of zinc chloride etherate (10 mol %) in dichloromethane at room temperature gave 2,5-di- and 2,3,5-trisubstituted furans in high yields (85−97%). DSC studies confirmed that a solely thermal process does not take place. A relevant catalytic process, employing μ-oxo-tetranuclear zinc cluster $Zn_4(OCOCF_3)_6O$, yielded bicyclic furopyrimidine nucleosides, when starting from acetyl-protected 5-alkynyl-2′-deoxyuridines (85−86%). Furopyrimidine was deprotected or simultaneously converted into pyrrolopyrimidine nucleoside. The time/concentration dependence for the reaction of 1-phenyl-4-(4-methylphenyl)butynone to 2-(4-methylphenyl)-5-phenylfuran displayed first-order kinetics with the rate dependent on catalyst concentration. The plot of ln k_{obs} versus ln[$ZnCl_2$] indicated first-order cycloisomerization, as referred to $ZnCl_2$ concentration, using both NMR and UV−vis reaction monitoring. The crystal structure of propyl furopyrimidine nucleoside (orthorhombic, $P2_12_12_1$, *a*/*b*/*c* = 5.684(2)/6.682(2)/36.02(2) Å, Z = 4) shows C2′-*endo* deoxyribose puckering, and the base is found in the *anti* position in crystalline form.

Adres publiczny

https://doi.org/10.1021/jo8007995

Strona internetowa wydawcy

https://www.acs.org/content/acs/en.html

Język

Angielski

Typ publikacji

Artykuł