SEPTEMBER 23-27 2024
19BMOS
BRAZILIAN MEETING ON ORGANIC SYNTHESIS
BENTO GONÇALVES, RS - BRAZIL

Nb_2O_5/H_2O_2 as an efficient catalyst for primary alcohols oxidation under visible-light conditions

Joy N. Egbucha[1,2]*, Luiz H. Dapper[2], Caroline S. Gomes[2], Francisco G. Nogueira[3], Filipe Penteado[4] and Eder J. Lenardão[2]

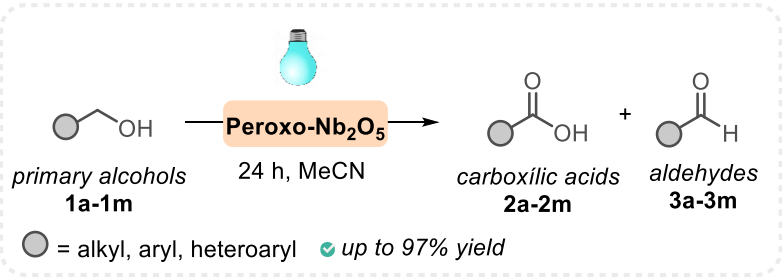
1) University of Agriculture and Environmental Sciences, P. M. B 1038, Umuagwo, Imo State, Nigeria,
2) Centro de Ciências Químicas Farmacêuticas e de Alimentos, UFPel, Pelotas-RS, Brazil, 96010-900
3) Departamento de Engenharia Química – CCET, UFSCAR, São Carlos-SP, Brazil, 13565-905
4) Departamento de Química – CCNE, UFSM, Santa Maria-RS, Brazil, 97105-900

e-mail: jayford360@gmail.com

Keywords: *primary alcohols oxidation, visible-light, niobium pentoxide, hydrogen peroxide*

ABSTRACT

Oxidation reactions are extremely important in organic synthesis, since they are widely used in total syntheses of several bioactive compounds.[1] A example is Luzopeptin A, a drug with antibiotic and antitumor activities, whose total synthesis involves a selective oxidation process of an alcohol to a carboxylic acid. Furthermore, aldehydes/carboxylic acids are widely used in chemical, pharmaceutical and functional materials industries.[2] Aiming to promote the oxidation of alcohols, most of the synthetic methodologies in the literature involves drastic conditions (highly acidic media, temperatures and large amount of oxidants).[3] As alternative, the modification of Nb_2O_5 with peroxide groups results in photosensitive materials, when promoted to the excited state by the absorption of visible-light, injecting electrons into the semiconductor conduction band. Those electrons can reduce O_2 molecules, releasing superoxide ions, which afford the oxidation of organic matter.[4] We present here the use of modified Nb_2O_5 in the visible light-promoted oxidation of primary alcohols (Scheme 1).



Scheme 1. Oxidation of primary alcohols with Nb_2O_5/H_2O_2

ACKNOWLEDGEMENTS

We thank for the financial support and scholarships from the Brazilian agencies CNPq, FAPERGS, CAPES and FINEP.

REFERENCES

1. Williams, T. J.; Cherepakhin, V. *Synthesis* **2020**, *53*, 1023-1034.
2. (a) Ciufolini, M. A.; Valognes, D.; Xi, N. *Tetrahedron Lett.* **1999**, 40, 3693–3696. (b) Luong, G. K. T.; Ku, Y. *Chem. Eng. Technol.* **2021**, *44*, 2178–2190.
3. (a) Mannam, S.; Sekar, G. *Tetrahedron Lett.* **2008**, 49, 1083–1086 (b) Stanje, B.; Traar, P.; Schachner, J. A.; Belaj, F.; Mösch-Zanetti, N. C. Dalt. Trans**. 2018**, *47*, 6412–6420. (c) Liu, K.-J.; Fu, Y.-L.; Xie, L.-Y.; Wu, C.; He, W.-B.; Peng, S.; Wang, Z.; Bao, W.-H.; Cao, Z.; Xu, X. and He, W-M. *ACS Sustain. Chem. & Eng.* **2018**, *6*, 4916–4921.
4. Silva, R. R. M.; Oliveira, J. A.; Ruotolo, L. A. M.; Faria, A. L. A.; Ribeiro, C.; Nogueira, F. G. E. *Mater. Lett.* **2020**, *273*, 127915.