SYNLETT
Spotlight 172

This feature focuses on a reagent chosen by a postgraduate, highlighting the uses and preparation of the reagent in current research

Iodic Acid (HIO_3)

Compiled by Arash Ghorbani Choghamarani[a,b]

Arash Ghorbani Choghamarani was born in Kermanshah, Iran in 1979. He finished his undergraduate studies in applied chemistry at Bu-Ali Sina University of Hamadan (2001) and received his M.Sc. in organic chemistry under the supervision of Prof. Mohammad Ali Zolfigol[a] (2003) and subsequently began his Ph.D. studies in organic chemistry with the same supervisor. At present, he is working as a visiting graduate student under the supervision of Professor Robert H. E. Hudson[b] at the University of Western Ontario, London, Ontario, Canada (since September 2005).
His research interests focus on the application of new reagents in organic reactions, the synthesis of organic compounds and some bicyclic fluorescent nucleosides.

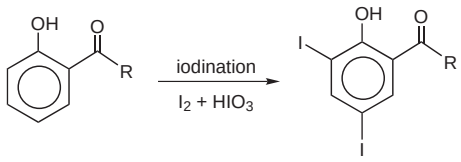
[a] Chemistry Department, Faculty of Science, Bu-Ali Sina University, Hamadan, Iran
[b] Chemistry Building, The University of Western Ontario, London, ON N6A 5B7, Canada
E-mail: a-ghorbani@basu.ac.ir; E-mail: aghorban@uwo.ca

Introduction

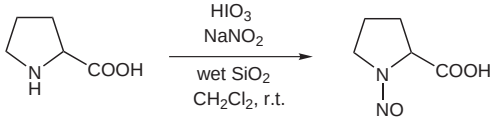
Iodic acid (HIO_3) has attracted much interest owing to its potential as oxidant,[1–8] reagent[9–12] and acidic source.[13,14] The use of iodic acid has been known for a long time and has been widely employed in numerous and different organic reactions such as: oxidation of sulfides,[1,3] iodination,[10,12] deprotection,[13] nitrosation,[14] and dehydrogenation of aldehydes and ketones.[15] This reagent has several advantages: cost-effectiveness, non-toxicity, easy and clean workup of products.

Abstracts

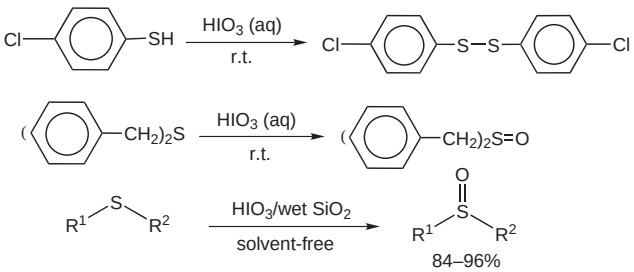
(A) Patil et al. reported a useful method for the iodination of hydroxy aryl ketones; they showed a variety of *ortho*-hydroxy-substituted aromatic carbonyl compounds which were selectively iodinated in 81–87% yield by using iodine and iodic acid.[10]



(B) Zolfigol and co-workers have used HIO_3 and $NaNO_2$ in the presence of wet SiO_2 as a nitrosating agent for the effective and selective nitrosation of secondary amines under mild and heterogeneous conditions in good yields.[14]

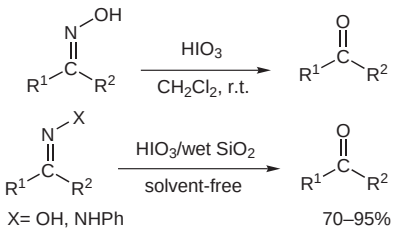


(C) Shirini et al. reported a simple and efficient method for the oxidation of thiols to disulfides and sulfides to sulfoxides in 87–95% yield using aqueous HIO_3 at room temperature.[3]
Also Lakouraj and co-workers have explained the utility of HIO_3 for oxidation of sulfides to sulfoxides in the presence of wet SiO_2 under solvent-free conditions.[1]

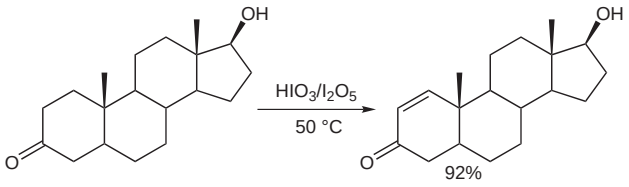


SYNLETT 2006, No. 14, pp 2347–2348
Advanced online publication: 24.08.2006
DOI: 10.1055/s-2006-949618; Art ID: V17705ST

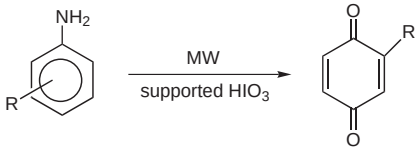
(D) Ketoximes and aromatic aldoximes are converted to the corresponding carbonyl compounds with HIO_3 under mild and heterogeneous conditions in CH_2Cl_2 at room temperature in 67–97% yields.[4]
Also deoximation and dehydrazonation have been reported using HIO_3 in the presence of wet SiO_2 under solvent-free conditions.[16]



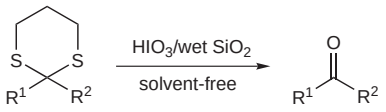
(E) A variety of aldehydes and ketones were readily and selectively transformed to 1,3-saturated aldehydes and ketones with HIO_3 and I_2O_5 at 45–65 °C in good yields.[15]



(F) Hashemi and Akhbari showed the conversion of a variety of aromatic amines into their corresponding quinines under microwave irradiation.[8]



(G) A variety of thioacetals and thioketals were deprotected to the corresponding carbonyl compounds with HIO_3 in the presence of wet SiO_2 at room temperature under solvent-free conditions.[13]



References

(1) Lakouraj, M. M.; Tajbakhsh, M.; Shirini, F.; Asady Tamami, M. V. *Synth. Commun.* **2005**, *35*, 775.
(2) Fabian, W. *Z. Kristallogr.* **1985**, *170*, 43.
(3) Shirini, F.; Zolfigol, M. A.; Lakouraj, M. M.; Azadbar, M. R. *Russ. J. Org. Chem. (Engl. Transl.)* **2001**, *37*, 1340.
(4) Chondrasekhar, S.; Gopalaiah, K. *Tetrahedron Lett.* **2002**, *43*, 4023.
(5) Hashemi, M. M.; Akhbari, M. *Russ. J. Org. Chem. (Engl. Transl.)* **2005**, *631*, 1574.
(6) Hashemi, M. M.; Rahimi, A.; Karimi-Jaberi, Z. *Acta Chim. Slov.* **2005**, *52*, 86.
(7) Hashemi, M. M.; Rahimi, A.; Ahmadibeni, Y. *Acta Chim. Slov.* **2004**, *51*, 333.
(8) Hashemi, M. M.; Akhbari, M. *Monatsh. Chem.* **2003**, 1561.
(9) Lio, W.; Zhou, J.; Wong, J. *Anal. Biochem.* **1982**, *120*, 204.
(10) Patil, B. R.; Bhusare, S. R.; Pawar, R. P.; Vibhute, Y. B. *Tetrahedron Lett.* **2005**, *46*, 7179.
(11) Dawane, B. S.; Vibhute, Y. B. *J. Indian Chem. Soc.* **2000**, *77*, 299.
(12) Krassowska-Swiebocka, B.; Prokopienko, G.; Skulski, L. *Molecules* **2005**, *10*, 394.
(13) Lakouraj, M. M.; Tajbakhsh, M.; Shrini, F.; Asady Tamami M, M. V. *Phosphorus, Sulfur Silicon Relat. Elem.* **2005**, *180*, 2423.
(14) Zolfigol, M. A.; Ghorbani Choghamarani, A.; Shirini, F.; Keypour, H.; Salehzadeh, S. *Synth. Commun.* **2001**, *31*, 359.
(15) Nicolaou, K. C.; Montagnon, T.; Baran, P. S. *Angew. Chem. Int. Ed.* **2002**, *41*, 1386.
(16) Shirini, F.; Zolfigol, M. A.; Azadbar, M. R. *Synth. Commun.* **2002**, *32*, 315.