SYNLETT Spotlight 14

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

2-Iodoxybenzoic Acid (IBX) and Dess-Martin Periodinane (DMP)

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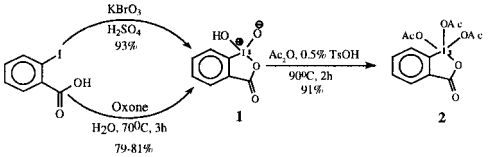
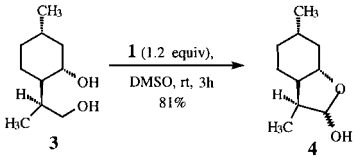
Recently, 2-iodoxybenzoic acid (IBX **1**)[1a] [1-hydroxy-1,2-benziodoxol-3(1*H*)-one 1-oxide] and Dess-Martin Periodinane (DMP **2**)[1b] [1,1,1-triacetoxy-1,1-dihydro-1,2-benziodoxol-3(1*H*)-one] {CAUTION!}[2] as oxidants have added glory to a long tradition of hypervalent iodine chemistry. DMP has attracted particular attention as the reagent of choice for oxidation of alcohols to the carbonyl compounds.[1b] Mildness, wide functional group tolerance, high yields without over-oxidation, and easy work-up procedure makes them versatile. IBX also oxidizes *vic*-diols without cleaving the glycol C-C bond,[1a,3a] allows oxidative deoximation,[3b] oxidative ring closure of amino alcohols to aminals[3c] and one pot selective 5'-oxidation/olefination of 2'-deoxynucleosides.[3d] Popularity of DMP as a preferred chemoselective oxidant in the plan of total synthesis is reflected by its current use in antifungal polycyclopropane compounds,[4a] immunosuppressant sanglifehrin A,[4b] potent antitumor agents saponin OSW-1[4c] and macrolide tedanolide.[4d]

Preparation: These reagents can be readily prepared from 2-iodobenzoic acid[1a,5] and used. Incidentally, IBX is a precursor of DMP.

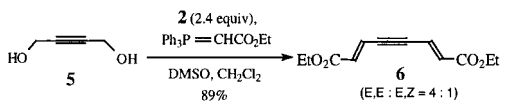


Abstracts

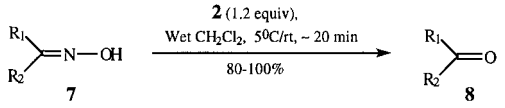
A) Use of IBX in DMSO as a selective oxidant opens up new avenue for the conversion of 1,4-bisprimary or 1,4-primary-secondary diol to γ-lactol**.** This implies that the oxidation of the primary hydroxyl group in **3** is considerably faster than the secondary hydroxyl function of either **3** or **4**, which could not previously be accomplished in one step.[6]



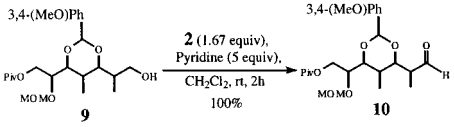
B) The oxidation of an acetylenic diol, such as 2-butyne-1,4-diol **5** to the unstable dial, trapped in situ with phosphorous ylide, provides a convenient homologation method to prepare dienyne **6**, which has potential use in the synthesis of polycyclopropane natural products.[4a]



C) An expeditious oxidative deoximation using DMP proceeds selectively in the presence of alcohols, *O*-methyl oximes, tosylhydrazones, acid sensitive groups and moieties in very high yields, in short time and under mild reaction conditions.[7]



D) Remarkable tolerance of wide varieties of sensitive functional group during oxidation of alcohol **9** to aldehyde **10** highlights use of DMP as the reagent of choice in synthesis of complex multifunctional 18-membered antitumor macrolide, tedanolide.[4d]



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(2) IBX/DMP is reported to be explosive under excessive heating and also under impact by Plumb, J. B.; Harper, D. J. *Chem. Eng. News* **1990**, *July 16*, 3.

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