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Spotlight 124

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): A Versatile Reagent

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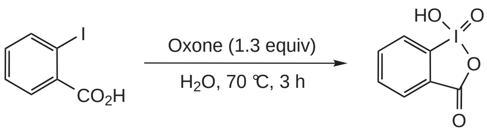
Introduction

The importance of hypervalent iodine reagents in organic chemistry has been demonstrated in recent years, and they have been found to have several desirable properties: they are mild, selective, efficient and eco-friendly.[1] 2-Iodoxybenzoic acid (IBX) has been developed as a powerful reagent for several organic transformations, and a recent surge in interest was driven by the publication of an improved method for its synthesis.[2a] IBX is a powerful single-electron transfer oxidant that readily accepts a new heteroatom-based ligand, and has been applied successfully for the construction of novel heterocycles.

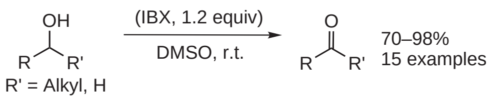
Preparation

According to a new improved procedure, IBX can be prepared in very good yield by the oxidation of 2-iodobenzoic acid with Oxone;[2a] this shows advantages over the previously reported methods.[2b]

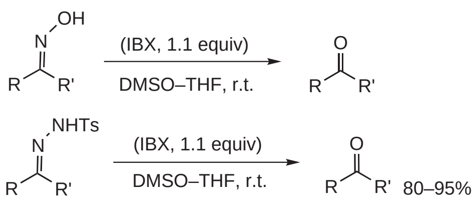


Abstracts

(A) IBX oxidizes 1° and 2° alcohols to the corresponding aldehydes and ketones, without any over-oxidation, in DMSO at room temperature.[3] Using different solvent systems and higher temperatures, yields of 90–100% can be obtained.[4] Environmentally benign ionic liquids have also been used as solvents for this transformation.[5]



(B) IBX has been used to oxidize oximes and tosyl hydrazones to the corresponding carbonyl compounds.[6]



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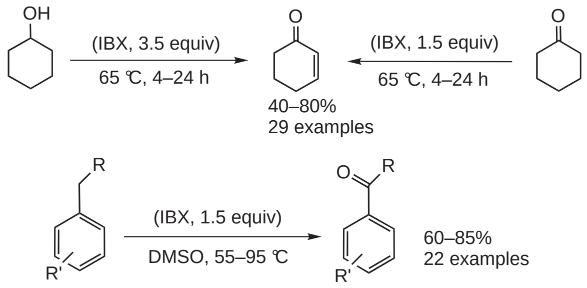
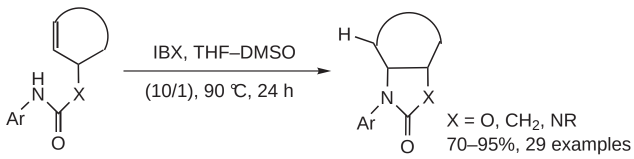
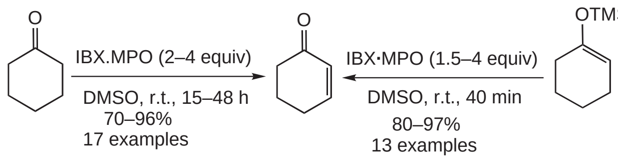
(C) IBX was used to oxidize saturated alcohols and carbonyl compounds[7a] to the corresponding α,β-unsaturated carbonyl system in one pot. It can also be used to oxidize the benzylic position.[7b]



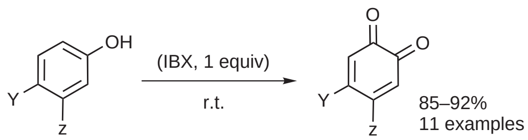
(D) IBX reacts with certain unsaturated N-aryl amides (anilides) to form novel heterocycles such as δ-lactams, cyclic urethanes, hydroxylamine and aminosugar building blocks.[8]



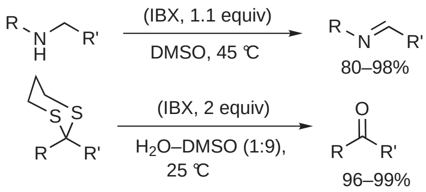
(E) In combination with an N-oxide (MPO), IBX was used to oxidize a carbonyl[9a] and its silyl enol ether[9b] to the corresponding α,β-unsaturated compounds in high yield at ambient temperature.



(F) A regioselective oxidation of phenols to *o*-quinones was performed with IBX.[10]



(G) Recently, IBX was used to convert nitrogen- and sulfur-containing substrates to synthetically useful intermediates.[11]



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