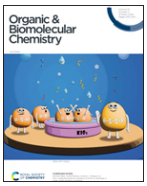

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Phenyliodine bis(trifluoroacetate) as a Sustainable Reagent: Exploring Its Significance in Organic Synthesis

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Abstract

Iodine-containing molecules have garnered substantial attention in the realm of organic synthesis during recent decades. Higher oxidation state iodine compounds, often denoted as 'hypervalent iodine compounds,' have proven to be valuable and sustainable reagents within the domain of synthetic chemistry. The utilization of hypervalent iodinated compounds for effecting chemical transformations has witnessed a remarkable surge. One such hypervalent iodine compound, phenyliodine bis(trifluoroacetate)/ bis(trifluoroacetoxy)iodo)benzene, commonly referred to as PIFA, has emerged as a prominent candidate due to its attributes of facile manipulation, moderate reactivity, low toxicity, and ready availability. PIFA presents an auspicious prospect as a substitute for costly organometallic catalysts and environmentally hazardous oxidants containing heavy metals. PIFA exhibits remarkable catalytic activity, facilitating an array of consequential organic reactions, including sulfenylation, alkylarylation, oxidative coupling, cascade reactions, amination, amidation, ring-rearrangement, carboxylation, and numerous others. Over the past decade, the application of PIFA in synthetic chemistry has witnessed substantial growth, necessitating an updated exploration of this field. In this discourse, we present a concise overview of PIFA's applications as a 'green' reagent in the domain of synthetic organic chemistry. A primary objective of this article is to bring to the forefront the scientific community's awareness of the merits associated with adopting PIFA as an environmentally conscientious alternative to heavy metals.