Synlett X. Jiang Cluster

Cluster Preface: Perspectives on Organoheteroatom and Organometallic Chemistry

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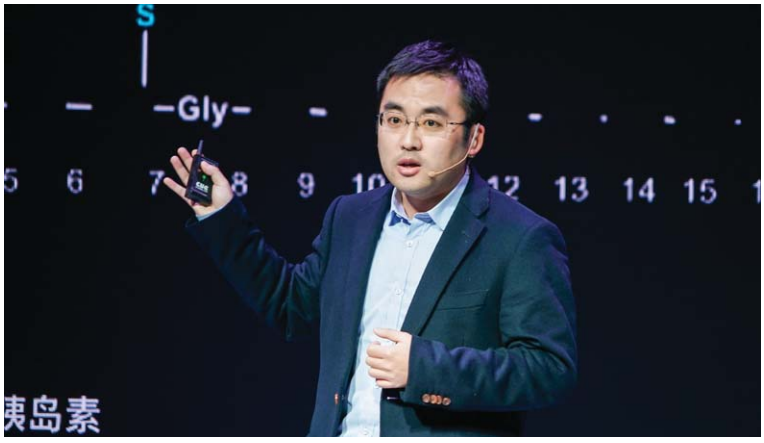
Published as part of the Cluster
Perspectives on Organoheteroatom and Organometallic Chemistry



Received: 25.06.2021
Accepted after revision: 25.06.2021
Published online: 29.07.2021
DOI: 10.1055/s-0040-1720387; Art ID: st-2021-u5555-c

Xuefeng Jiang is a professor at East China Normal University. He received his B.S. degree in 2003 from Northwest University (China). He then joined Professor Shengming Ma's research group at the Shanghai Institute of Organic Chemistry (SIOC), Chinese Academy of Sciences, where he received his Ph.D. degree in 2008. From 2008 to 2011, Xuefeng worked as a postdoctoral researcher on the total synthesis of natural products in the research group of Professor K. C. Nicolaou at The Scripps Research Institute (TSRI). His independent research interests have focused on green organosulfur chemistry and methodology-oriented total synthesis.

Every element possesses unique properties. The cutting-edge perspectives of elementary organochemistry generally center around basic synthesis. Fourteen respected authors have assessed the current status of elementary organochemistry, with an emphasis on identifying the key advances being made or on those that are needed, as well as providing an outlook. Their perspectives, represented by current literature including key contributors and references, primarily serve to inspire and help direct future research efforts. With 14 elements involved, namely boron, silicon, sulfur, selenium, chlorine, bromine, iodine, magnesium, titanium, chromium, manganese, gold, iridium and uranium, the perspectives in this SYNLETT Cluster analyze the progress made with these elements in organic chemistry.

The perspective on boron briefly describes the most recent progress on organoboron chemistry, with a focus on new boron molecules and their applications that have attracted significant interest from mainstream chemists.[1] Silicon is viewed from the perspective of catalytic hydrosilylation and the synthesis of silicon-stereogenic silanes.[2] Sulfur is introduced with several new reaction methods that utiylize sulfur-mediated reactions triggered by sulfonium salts and ylides, highlighting the interplay of rational design and serendipity.[3] Selenium is highlighted from the perspective of recent key advances in selenium catalysis, selenonium catalysis, selenium-based chalcogen bonding catalysis, and Lewis basic selenium catalysis.[4] Chlorine is briefly analyzed in such areas as its general properties, recent advances in its introduction and applications to organic solar cells (OSCs), a short discussion of current questions regarding chlorination in OSCs and its future developments in this area.[5] Bromine is discussed from the perspective of recent advancements in C–Br bond-forming reactions.[6] Iodine is assessed from a number of recent research results and the future of hypervalent iodine chemistry.[7] Magnesium is described from the current progress on the development of in situ generated magnesium catalysts and their application in asymmetric synthesis.[8] Titanium is summarized from the radical dehydroxylative transformation of alcohols, either promoted or catalyzed by titanium, and from the point of view of studies in this field.[9] Chromium draws attention from recent advances on Cr-catalyzed cross-coupling reactions offering selective strategies for molecule construction, and the ability of low-valent Cr with a high-spin state to participate in the process of two-electron oxidative addition.[10] Manganese attracts focus from recent progress on manganese-catalyzed C(sp^2)–H addition to polar unsaturated bonds.[11] Gold is evaluated from recent progress on gold-catalyzed formal annulations of ynamides with isoxazole derivatives as nitrene-transfer reagents via α-imino gold carbenes in the atom-economic and rapid construction of N-heterocycles.[12] The work on iridium explores a novel (pentamethylcyclopenta-1,3-dienyl)iridium(III)-catalyzed direct C–H functionalization of triarylphosphine oxides with diazo dicarbonyl compounds through carbene insertion.[13] Uranium is presented from the perspective of the most recent advances on photoredox transformations enabled by uranyl salts.[14]

This special collection of perspectives provides a comprehensive review of flourishing elementary chemistry in organic synthesis and is expected to be a valuable resource for elementary organochemistry professionals. The target groups can be scientists, researchers and graduate students in organic chemistry and element chemistry, as well as those who are interested in these fourteen types of element. I really appreciate the work of the many colleagues who have contributed their expertise to this SYNLETT Cluster.

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Shanghai, China
June 2021

Conflict of Interest

The authors declare no conflict of interest.

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