## Catalytic Transformations via C–H Activation

Catalytic functionalization of inert aromatic and aliphatic carbon–hydrogen (C–H) bonds has become an increasingly important tool in organic synthesis, and is arguably one of the hottest research topics in the past decade. Herein, a timely collection of topics from this field is offered by the two *Science of Synthesis* volumes on *Catalytic Transformations via C–H Activation* edited by Jin-Quan Yu.

While still rapidly developing, methods and catalyst design for catalytic C–H cleavage and subsequent functionalization have significantly impacted the field of synthesis of complex organic molecules. For example, with these methods in hand, one can start to use more readily available and less expensive starting materials for quick assembly of complex targets without the need for functional group manipulations. Now, one can also introduce functional groups at positions that were previously thought unreachable or impossible. In addition, we can imagine that one day, when a full set of C–H functionalization tools are made available, an ideal situation is that synthetic chemists will be able to introduce any functional group at any position in a given target molecule. Clearly, this research field has got a bright future, but there are still many challenges to overcome. Questions, such as whether we can control the site-selectivity, i.e. which C–H bond to be functionalized, whether we can expand the reaction scope to allow any desired type of functional groups to be introduced, and whether we can tolerate the existing functional groups during the C–H functionalization (chemoselectivity), are constantly the focus of recent studies.

To date, although there are a number of excellent reviews on C–H activation or C–H functionalization, the two *Science of Synthesis* volumes on catalytic C–H Functionalization provide a comprehensive up-to-date overview of this rapidly evolving field with remarkable experimental details. These monumental volumes give a thorough treatment of classically defined C–H activation, involving formation of metal–carbon bonds; moreover, carbene-, nitrene-, and radical-mediated transformations, more precisely named as C–H functionalization, are also systematically covered. It is noteworthy that the well-organized abstracts and table of contents make exploration of specific subjects facile.

The two volumes were contributed by first-class experts in the field of catalytic C–H functionalization. Volume one focuses on functionalization of aromatic C–H bonds, which has attracted intensive attention during the last 15 years. It starts with arylation, to form biaryl compounds, followed by vinylation and alkylation of arenes. This volume ends with an impressive systematic summary on heteroarene C–H functionalization. Volume two covers a range of different aspects, including allylic functionalization, C($sp^3$)–H activation, carbene-, nitrene-, and radical-mediated approaches, dehydrogenative biaryl formation, C–H carbonylation and carboxylation, as well as aryl–heteroatom bond formation. In one word, the width and depth of the books are exceptional.

In conclusion, I fully recommend these two *Science of Synthesis* volumes on *Catalytic Transformations via C–H Activation*. They can serve as excellent reference sources for researchers working in the area of organic synthesis. They also provide great educational materials for students who are entering the synthetic organic field and eager to learn the state-of-the-art of C–H functionalization. Finally, these two books should also inspire researchers developing new directions on the related topics in the future.

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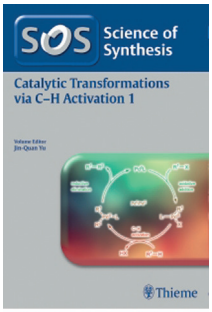


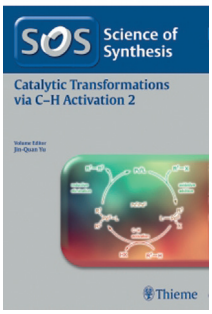


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