

Preface

Over the past decade, carbon–hydrogen bond activation has been probably one of the most studied fields in Chemistry, as demonstrated by the increasing amount of publications on the subject.

Thirty years ago, the activation of carbon–hydrogen bonds of hydrocarbons by transition metal complexes led researchers to believe that the development of catalytic systems could convert the readily available alkanes into value added products. However, despite the simplicity and affordability of these raw materials, to date their use in industrial chemistry is still very limited.

Alkane C–H Activation by Single-Site Metal Catalysis presents the current state-of-the-art development in the catalytic systems for the catalytic transformations of alkanes under homogeneous conditions. Its six chapters follow the timeline of achievements in the field. [Chapter 1](#) summarizes the overall vision of the subject. [Chapter 2](#) reviews the so-called electrophilic activation, initiated by Shulpín in the late 1960s, and the base for the Catalytica system. [Chapter 3](#) examines the catalytic borylation of alkanes, discovered by Hartwig, whereas [Chap. 4](#) provides an updated vision of the alkane dehydrogenation reaction. [Chapter 5](#) covers the oxygenation of C–H bonds, a field of enormous interest with bioinorganic implications, and finally [Chap. 6](#) presents the functionalization of alkane C–H bonds by carbene or nitrene insertion.

Each chapter concludes with a perspective of the topics discussed to inspire future works on alkanes and to motivate more and more researchers to take part in the challenge of converting alkanes into practical raw materials for industrial chemistry.

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Pedro J. Pérez