

Photoactive Copper Complexes: Properties and Applications

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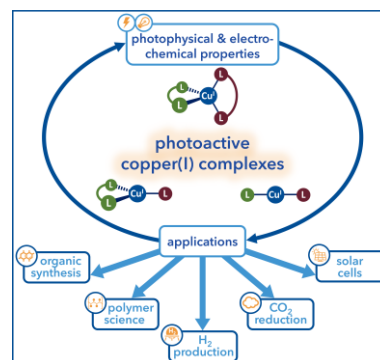
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Abstract. Photocatalyzed and photosensitized chemical processes have seen growing interest recently and have become among the most active areas of chemical research, notably due to their applications in fields such as medicine, chemical synthesis, material science or environmental chemistry. Among all homogeneous catalytic systems reported to date, photoactive copper(I) complexes have been shown to be especially attractive, not only as alternative to noble metal complexes, and have been extensively studied and utilized recently. They are at the core of this review article which is divided into two main sections. The first one focuses on an exhaustive and comprehensive overview of the structural, photophysical and electrochemical properties of mononuclear copper(I) complexes, typical examples highlighting the most critical structural parameters and their impact on the properties being presented to enlighten future design of photoactive copper(I) complexes. The second section is devoted to their main areas of application (photoredox catalysis of organic reactions and polymerization, hydrogen production, photoreduction of carbon dioxide and dye-sensitized solar cells), illustrating their progression from early systems to the current state-of-the-art and showcasing how some limitations of photoactive copper(I) complexes can be overcome with their high versatility.



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