Good Kobolds: heptacoordinate Co(II) catalysts for hydrogen evolution

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The most active cobalt-based catalysts for light-driven hydrogen evolution are usually based on hexacoordinate polypyridine complexes with a distorted octahedral structure.[1,2] We have challenged this paradigm by developing cobalt complexes based on a hexadentate polypyridyl ligand, which show an exotic heptacoordinate structure and outstanding performances with respect to their hexacoordinate counterparts.[3,4] In this talk the results of our investigations concerning the optimizations of such a class of catalysts are presented (Figure 1). In particular, the effect of the introduction of electron-donating and electron-withdrawing groups (aimed at haltering the ligand electronic properties) will be discussed and compared with the effect of the presence of groups potentially acting as proton relay units.[5,6] The impact of the variation of the electron transfer kinetic, deriving from the use of milder photochemically-generated reducing agents, will be also discussed.[7] The aim of this talk is to provide an overview of the structure-activity investigation of this class of catalysts, providing new insights for the design of more efficient hydrogen evolution catalysts.

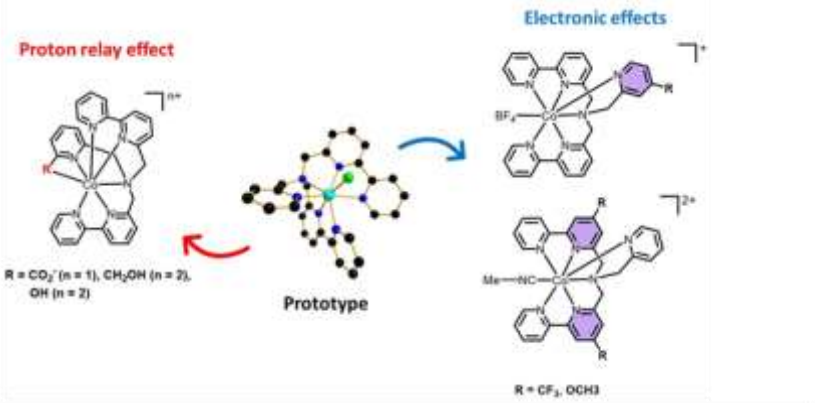

***Figure* 1**: Families of heptacoordinate Co(II) complexes for efficient photochemical hydrogen evolution.

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