Visible light driven CO$_2$ reduction with Fe and Co complexes combined to semi-conductive materials

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Recent attention aroused by the reduction of carbon dioxide has as main objective the production of useful organic compounds and fuels – renewable fuels – in which solar energy would be stored. Molecular catalysts can be employed to reach this goal. One route consists in first converting sunlight energy into electricity that could be further used to reduce CO$_2$ electrochemically.[1-2] Another approach is to directly use the visible photons and photo-stimulate the electrochemical reduction of the gas in the presence of an appropriate sensitizer.[3-4]

Molecular catalysts may provide excellent selectivity but usually with less durability and more complex processability than solid materials. Hybrid systems in which a robust molecular catalyst is associated to a conductive or semi-conductive material may combine the advantages of both homogeneous and heterogeneous catalysis [5-6]. Our recent results will be discussed, illustrating the rich potential of molecular catalysts to generate fuels from CO$_2$.

Keywords: Artificial photosynthesis, CO$_2$ catalysis, semi-conductive carbon materials

References