

Molecular catalytic (electro, photo)reduction of CO₂: from C1 to C2+ products

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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, either in photochemical or electrochemical (or combined) contexts. They may in particular provide excellent selectivity thanks to easy tuning of the electronic properties at the metal and of the ligand second and third coordination sphere. Recently we have shown that such molecular catalysts may also be tuned for generating highly reduced products such as formaldehyde, methanol and methane, leading to new exciting advancements. Obtaining C-C coupling products is an additional intriguing possibility. Our recent results will be discussed, using earth abundant metal (Fe, Co) porphyrins and phthalocyanines as well as related complexes as catalysts, being dispersed in solution or assembled at (semi)conductive materials.

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