Photophysics of dinuclear rhenium(I) complexes

Monica Panigati

Department of Chemistry, Università degli Studi di Milano, Via Golgi 19, 20133 Milano, Italy
monica.panigati@unimi.it

The outstanding photophysical properties of mono- and poly-nuclear Re(I) diimine carbonyl complexes have been the subject of many studies for a long time [1]. In this perspective, an overview of luminescent dinuclear tricarbonyl rhenium(I) complexes of general formula $[Re_2(\mu\text{-}X)(\mu\text{-}Y)(CO)_6(\mu\text{-}1,2\text{-diazine})]$ (X or Y = halide, hydride, carboxylate, alkoxide, chalcogenide) will be provided. The electrochemical and photophysical properties, in solution or in solid state, will be presented together with combined density functional (DFT) and time-dependent density functional (TDDFT) studies of their geometry, relative stability and electronic structure. The relationships between the structure and the photophysical properties of the complexes will be discussed in detail, together with some of their interesting applications such as: *i*) luminescent probes for sensing and biological labelling [2]; *ii*) emissive dopants in electroluminescence devices [3]; *iii*) photosensitizers in dye-sensitized solar cells [4]; *iv*) catalysts in electrocatalytic CO_2 reduction [5]. Due to the outstanding and easily tunable photophysical and photofunctional properties of this class of dinuclear complexes, a wide range of new possible applications can be expected, and are waiting to be discovered and pursued.

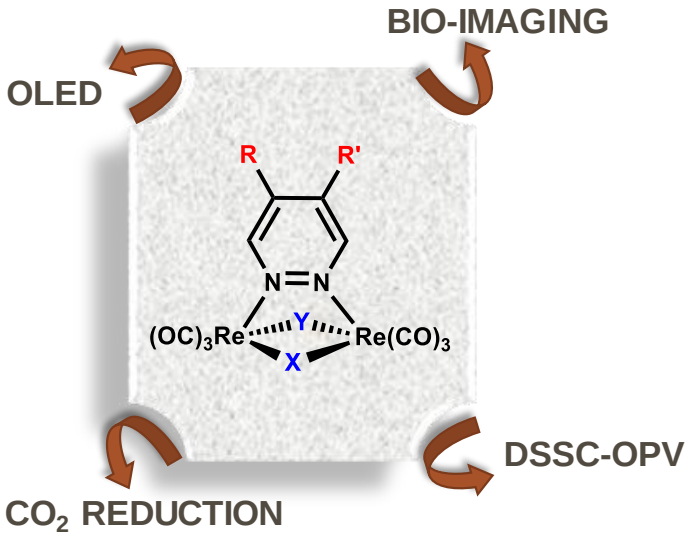

Fig. 1. Sketch of the dinuclear Re(I) complexes molecular structure.

References:

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