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CONFERENCE

Intitulée

THE INVISIBLE MADE VISIBLE WITH (IN)VISIBLE LIGHT: PHOTOCHEMICAL DYNAMICS OF TRANSITION METAL COMPLEXES

donnée par

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le MARDI 24 MARS à 16h30

SALLE 1S081
Sciences III

30 quai Ernest-Ansermet ou 4 bld d'Yvoy

Responsable : Dr. Ricardo J. Fernández-Terán

The Invisible Made Visible with (In)visible Light: Photochemical Dynamics of Transition Metal Complexes

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For decades, infrared (IR) spectroscopy has been a valuable tool to elucidate the static structure of molecules – in the gas phase, in liquid solution, and in solid matrices. When carried out with pulsed electric fields, it can provide direct access to the dynamic evolution of the structure of molecules, either at thermal equilibrium or in response to an external stimulus, e.g. a photonic excitation. Time-resolved IR-spectroscopy can be conducted in distinct modes of operation thereby giving access to time scales from tens of femtosecond to hundreds of seconds. [1]

Here, we will report on the utility of these techniques in studies of the photochemistry of transition metal (TM) complexes. Depending upon time, we will touch on either of the three specific topics:

(i) TM-carbon dioxide binding: using ligand-to-metal charge transfer excitation of TM-oxalates, CO_2 complexes can be prepared *in situ* and information about their molecular structure can be obtained from experimental time-resolved IR-data combined with electronic structure calculations. [2-4]

(ii) TM-nitride and nitrene formation: electronic excitation of late TM-azides yields non-isolable terminal nitrido and nitreno complexes through dinitrogen cleavage. Despite their fleeting nature, the chemical reactivity of these species can also be tested in intricate quenching studies. [5-8]

(iii) Titanium-based photo-redox catalysis: catalytic transformations relying on the earth-abundant metal, titanium, and light open the avenue to single-electron-transfer chemistry, i.e. chemistry with radicals! We will show how femtosecond spectroscopy can monitor the entry events into photo-redox catalytic cycles.

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