

Probing of charge accumulation on a Ruthenium polypyridine complex by sequential excitation

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Artificial photosynthesis requires several rounds of light-induced charge separation to accumulate enough redox equivalents at the catalytic sites for the target chemistry to occur. Previous studies on molecular photocatalysts often focus mainly on product formation rather than on the comprehension of charge accumulation mechanism. In order to better understand the multielectron redox chemistry in artificial photosynthesis molecular systems, it is desirable to obtain insight into the elementary steps of charge accumulation.

A recent study of a molecular dyad containing a naphthalene diimide (NDI) linked to a [Ru(bipyridine)₃]²⁺ chromophore (Fig. 1) showed that photoexcitation leads to an efficient electron transfer to the NDI moiety in the presence external reversible electron donor.^[1] Using a double-excitation nanosecond pump-pump-probe experiment, we demonstrate that this molecular dyad performs two successive rounds of photo-induced electron transfer, leading to the formation of doubly reduced state NDI²⁻, with reversible electron donor.

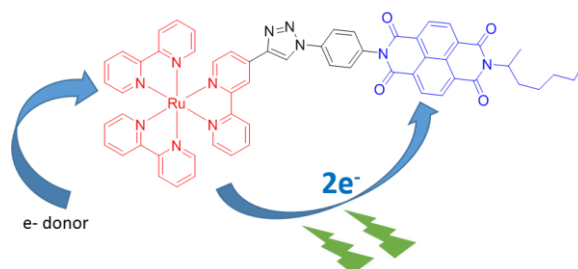


Figure 1. Molecular structure of Ruthenium polypyridine-naphthalene diimide complex.

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References:

[1] A. Baron, C. Herrero, A. Quaranta, M.-F. Charlot, W. Leibl, B. Vauzeilles and A. Aukauloo, *Inorg. Chem.*, 2012, **51**, 5985.