

MAR14-2013-003220

Abstract for an Invited Paper  
for the MAR14 Meeting of  
the American Physical Society

### **Energy and Charge Transfer in Dinuclear Ru-based Complexes<sup>1</sup>**

VALERIA KLEIMAN, University of Florida

In this work, the excited state dynamics of a series of dinuclear compounds combining Ru based chromophores with M=Ru(II), Fe(II), Fe(III), Cr(III) are explored. Ru- $\mu$ -NC-M dimers are good candidates to investigate the competition between electron and energy transfer in arrays of chromophores. The presence of a  $\mu$ -NC bridge affords a strong coupling between the moieties without providing acceptor states that might act as electron traps. Polypyridyl Ru based compounds play an important role on light-harvesting antennas for energy conversion. With proper knowledge of the excited state dynamics, multinuclear arrays of chromophores can be developed. Our studies focus on (i) energy/electron transfer from the Ru(II) to a 2<sup>nd</sup> M center through the cyanide bridge, and (ii) geometry changes due to the exchange of one of the Ru(II) polypyridyl ligands. Broadband ultrafast spectroscopy shows excited state dynamics in the psec time regime. These dynamics depend strongly on the nature of the acceptor and the orientation of the ligand involved in the photoinduced transition. Hence, the competition between energy and electron transfer across the bridge is modulated by the selective choice of the secondary M center. We conclude that transition metals from the 3<sup>rd</sup> row are good candidates for longer arrays since their lack of low-lying MC states precludes thermal deactivation.

Work done in collaboration with Shiori Yamazaki and Jaired Tate, University of Florida; Alejandro Cadranel and Luis Baraldo, Universidad de Buenos Aires.

<sup>1</sup>This work is based upon work supported by NSF (CHE-1058638) and CONICET