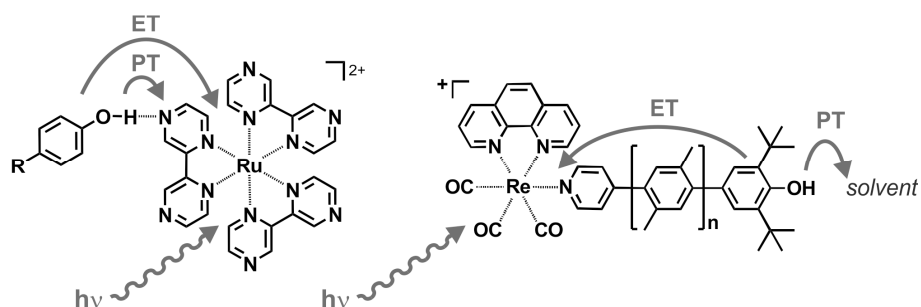


Photoinduced Electron and Proton Transfer with Metal Complexes and Organic Molecules

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Proton-coupled electron transfer (PCET) plays a key role in the activation of small inert molecules such as H₂O, CO₂, or N₂. In this greater context it seems important to understand PCET reactions on a fundamental level. Over the past few years our group has performed a series of mechanistic studies of photoinduced PCET. [1] In a typical reaction, a photoexcited Ru(2,2'-bipyridine)₃²⁺ complex was used to trigger coupled electron (ET) and proton transfer (PT) from phenols (or thiophenols) to the ruthenium complex (Figure 1, left). [2,3]



In other studies we have explored photoinduced long-range electron transfer reactions which are coupled to short-range proton transfers (Figure 1, right). [4] Even electron tunneling events occurring over distances of 20 Å can take place in concert with proton transfer. [5] The influence of electron donor – electron acceptor distance on long-range PCET was explored systematically. [6]

The last part of the presentation will focus on our recent studies of electron transfer in donor-bridge-acceptor molecules and organic mixed valence compounds. [7,8]

Recent references:

- [1] O. S. Wenger, *Acc. Chem. Res.* 2013, 46, 1517. [2] C. Bronner, O. S. Wenger, *J. Phys. Chem. Lett.* 2012, 3, 74. [3] M. Kuss-Petermann, O. S. Wenger, *J. Phys. Chem. Lett.* 2013, 4, 2535. [4] M. Kuss-Petermann, H. Wolf, D. Stalke, O. S. Wenger, *J. Am. Chem. Soc.* 2012, 134, 12844. [5] C. Bronner, O. S. Wenger, *Phys. Chem. Chem. Phys.* 2014, 16, 3617. [6] J. Chen, M. Kuss-Petermann, O. S. Wenger, *Chem. Eur. J.* 2014, doi: 10.1002/chem.201304256. [7] B. He, O. S. Wenger, *J. Am. Chem. Soc.* 2011, 133, 17027. [8] J. Hankache, O. S. Wenger, *Chem. Rev.* 2011, 111, 5138.