

Photoinduced Electron Transfer Quenching and Sugar Effects on the Electrostatic Interaction Between an Anionic Ru(II) Complex and Cationic Bipyridinium Derivatives Functionalized with Boronic Acids

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Abstract

The photoinduced electron transfer quenching of an anionic ruthenium(II) metal-ligand – complex (Ru[dpp(SO₃Na)]Cl₂) by two boronic acid functionalized benzyl viologen(BV²⁺) derivatives has been investigated as well as their response to sugar. In this study, we presented the electron transfer quenching properties, association constants and subsequent sugar effect between two quenchers and Ru(II) MLC complex. Ruthenium MLC are today well know their good spectral characteristics (Photo-stability, large stokes shift, long-wavelength emission, long-lifetime etc.) and are very promising as active material for the elaboration of optical sensors¹. The stern-volmer constants (k_{sv}) obtained from steady-state and time-dependent measurements and super linear quenching is discussed in term of static quenching and sphere of action model. Consequence of the presence of sugar on the k_{sv} and static quenching is also presented and discussed as well as the effect of the ionic strength of the solution on these parameters. Quenching rate constants (k_q) calculated are one order higher than the quenching rate constant reported for the system Ru(bpy)₃²⁺/ MV²⁺ ($k_q = 0.74 \times 10^{-9} \text{ M}^{-1}\text{S}^{-1}$)². Sugar titration curves are presented and discussed in term of future development of optical sensors based on this mechanism.

1. J. R. Lakowicz, *Principles of Fluorescence Spectroscopy*, Kluwer Academic / Plenum Press, 2e ED., New York, 1999, p. 573.
2. A. Yoshimura, M. J. Uddin, N. Amasaki, and T. Ohno, *J. Phys. Chem. A*, 2001, 105, 10846.