

Magnetic Field Effects on Dynamics of Photogenerated Biradical in Zinc Porphyrin-Viologen Linked Compounds in Ionic Liquid

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Room-temperature ionic liquids (RTILs) are currently the focus of extensive investigation because they possess unique properties (negligible vapor pressure, high viscosity, high ionic conductivity, and high thermal, chemical, and electrochemical stabilities etc.) [1]. The RTILs are expected to provide a useful microenvironment for chemical reactions and numerous synthetic and electrochemical studies have been reported. However, some questions as to fundamental characterization (structures and dynamics) of the RTILs are still open.

We have examined photoinduced electron-transfer reactions and magnetic field effects (MFEs) on the photogenerated biradicals in donor-acceptor linked compounds, and found the MFEs on the triplet biradicals which were photogenerated from intramolecular electron-transfer reactions [2,3]. The MFEs have been powerful for verifying the mechanism in photochemical reactions. In addition, the magnitude of MFEs varied with microenvironment around the photogenerated biradicals in reaction fields. In other words, the MFEs are expected to become a useful method for evaluating the microenvironment in reaction fields. In the study, we examined photoinduced electron-transfer reactions and MFEs on dynamics of the biradical of zinc-tetraphenylporphyrin (ZnP)-viologen linked compounds (**ZnP(n)V(n=4,6,8)**) in **[BMIM][BF₄]** as the RTIL.

Transient spectra of **ZnP(n)V(n=4,6,8)** following YAG laser excitation at 532nm indicated that intramolecular electron transfer from triplet excited state of ZnP to viologen occurred in **[BMIM][BF₄]**. Decay rate constants for biradical decreased as increasing magnetic field from zero to 0.2 T and became constant above 0.2 T (Fig. 1). In addition, The MFEs were dramatically affected by temperature and spacer chain length. We will discuss about the MFEs in **[BMIM][BF₄]** as a RTIL as compared with molecular solvents.

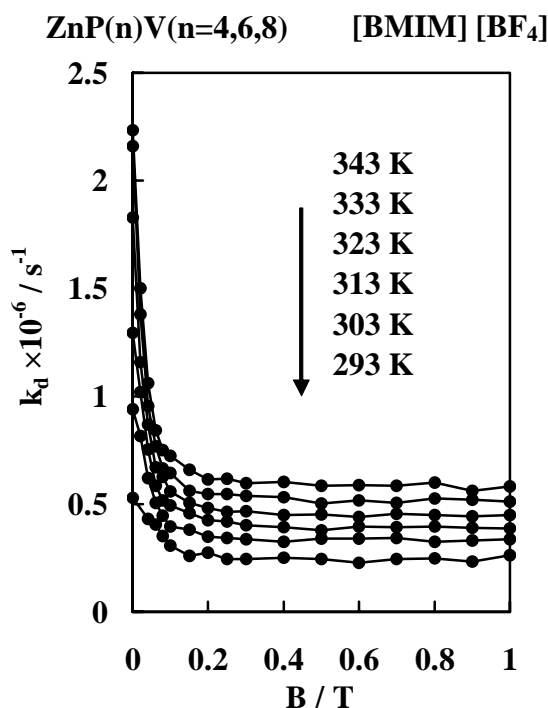
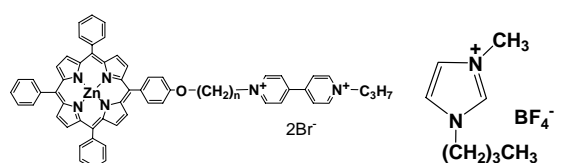


Fig. 1 Temperature dependence on the MFEs on decay rate constants (k_d) in **ZnP(6)V** in **[BMIM][BF₄]**.

References

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