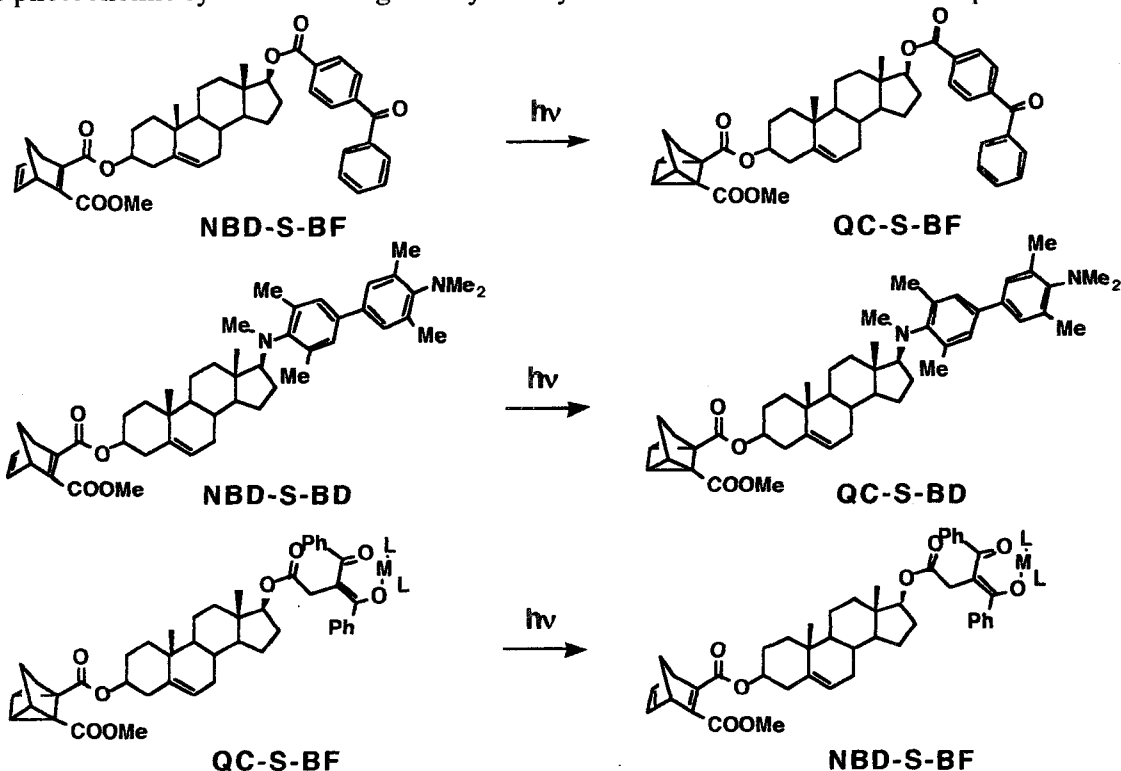


INTRAMOLECULAR LONG-DISTANCE ELECTRON TRANSFER AND ENERGY TRANSFER IN NORBORNADIENE-STEROID SENSITIZER SYSTEMS

Chen-Ho Tung, Li-Ping Zhang, Hong Cao, Yoshifumi Tanimoto

Institute of Photographic Chemistry, Chinese Academy of Sciences, Beijing 100101, China

The following three bichromophoric compounds were synthesized and their photophysics and photochemistry were investigated by steady-state and time-resolved techniques.



The phosphorescence quenching and triplet lifetime determination of the BP group and the intramolecular photosensitization isomerization of the NBD group in NBD-S-BD suggest that long-distance intramolecular triplet energy transfer occurs with efficiency of ca. 22% and rate constant of $1.5 \times 10^5 \text{ sec}^{-1}$ [1]. In NBD-S-BD, intramolecular electron transfer from $^1\text{BD}^*$ to NBD proceeds with efficiency of ca. 12% and rate of $1.1 \times 10^7 \text{ sec}^{-1}$, and the energy transfer from $^3\text{BP}^*$ to NBD occurs with efficiency of ca. 65% and rate of ca. $5.2 \times 10^5 \text{ sec}^{-1}$. Both processes result in isomerization of NBD to QC [2]. In QC-S-BF, only the intramolecular electron transfer from QC to $^1\text{BF}^*$ was detected, and the efficiency and rate were 25% and $1.0 \times 10^9 \text{ sec}^{-1}$, respectively [3]. The above long-distance intramolecular electron transfer and triplet energy transfer are proposed to proceed via through-bond mechanisms.

Acknowledgment: We thank the National Science Foundation of China for financial support.

References

- [1] C. -H. Tung, L. -P. Zhang, Y. Li, H. Cao and Y. Tanimoto, *J. Phys. Chem.*, **1996**, *100*, 4480.
- [2] C. -H. Tung, L. -P. Zhang, Y. Li, H. Cao and Y. Tanimoto, *J. Am. Chem. Soc.*, **1997**, *101*, in press.
- [3] C. -H. Tung, L. -P. Zhang, Y. Li, H. Cao and Y. Tanimoto, Unpublished manuscript.