Exploring Regio-Selective Spin Interactions: Positional Isomerism and its Influence on Spin Communication in Light-Induced Multi-Spin Systems

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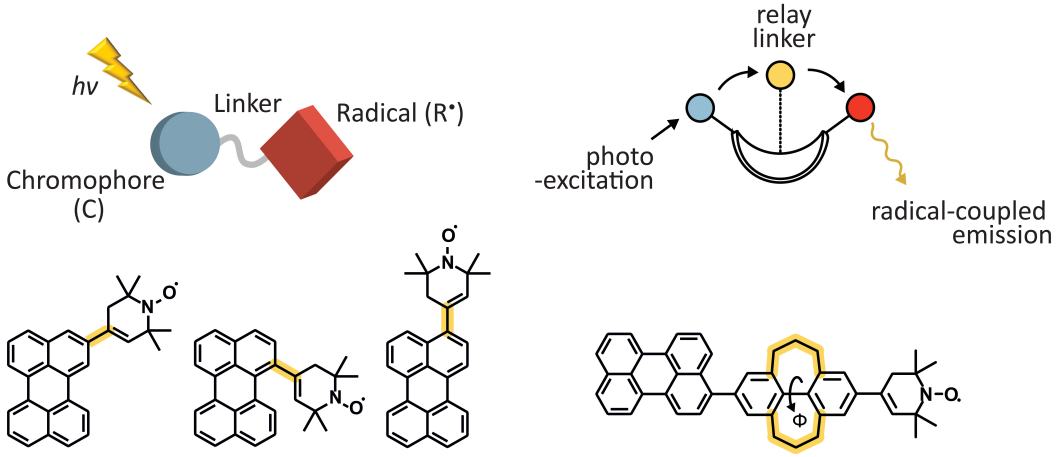
Highly versatile photogenerated multi-spin systems are promising candidates to explore the factors governing spin communication on a molecular level.[1] While the radical acts as a sensitizer that improves the intersystem crossing rate, the delicate covalent linkage between chromophore-radical systems serves as a means of controlling the excited state dynamics of the chromophore.[2] The aim of this project is to develop covalent multi-spin systems to study spin-information transfer and storage. This is performed by engineering systems that consist of at least two organic spin centers that we connect by a conjugated framework. The bridge between the two spin centers is then systematically modified to trace the changes in the resulting spin communication. By choosing a bridged biphenyl as the linker between the chromophore and the radical, the electronic communication throughout the synthon is expected to vary with the torsion angle Φ between the planes of the two phenyl rings, which in turn modulates the spin-spin interaction.



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(2) Nolden, O.; Fleck, N.; Lorenzo, E. R.; Wasielewski, M. R.; Schiemann, O.; Gilch, P.; Richert, S. *Chem–Eur. J.* **2021**, *27* (8), 2683-2691.