



Origin of ultrafast radiationless deactivation dynamics of free-base subpyrriporphyrins.

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Streszczenie

In this study, we have investigated the photophysical properties of free-base subpyrriporphyrins by changing the peripheral substituents from phenyl to nitrophenyl groups. While the electron withdrawing nature of nitrophenyl substituent gives rise to a noticeable perturbation in the absorption spectrum arising from the charge-transfer (CT) transition, both molecules show similar excited state dynamics at ambient temperature. This feature is mainly due to the fact that the CT transitions caused by the nitrophenyl substituent in free-base subpyrriporphyrin are located higher in energy than the lowest excited S_1 state. Moreover, through the temperature dependence and protonation experiments, we have demonstrated that the NH-tautomerization is a key factor in determining the excited state dynamics of free-base subpyrriporphyrins. In this sense, we can suggest that the control of substituent and solvents in free-base subporphyrinoids could be a new strategy for the fine-tuning of photophysical properties. Furthermore, to the best of our knowledge, this is the first study to illustrate the photophysical properties of free-base subporphyrinoids.

Słowa kluczowe

subporphyrinoids, tautomerization, excited state dynamics, temperature dependence, protonation

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