Geometry-Controlled Photoinduced Charge Separation and Recombination in a *Trans*-A_2B_2-Functionalized Donor–Acceptor Conjugate Composed of a Multimodular Zinc Porphyrin and Fullerene


Alejandro Benitz


Michael B. Thomas


Prof. Dr. Francis D'Souza

https://chemistry.unt.edu/

The front cover artwork is provided by the D'Souza group at the Department of Chemistry, University of North Texas. The image shows the optimized structure of a *trans*-A_2B_2-functionalized multimodular zinc porphyrin/fullerene supramolecular donor–acceptor conjugate and the geometry-governed photochemical events which occur upon photoexcitation of the porphyrin. Read the full text of the article at 10.1002/cptc.201600017.

Could you describe your institute?

The University of North Texas (UNT), based in Denton, Texas, is a public institution of higher education and research committed to a wide array of sciences, engineering fields, liberal arts, fine arts, performing arts, humanities, public policy, and graduate professional education. Ten colleges, two schools, an early admissions math and science academy for exceptional high-school-age students from across the state, and a library system comprise the university core. Its research is driven by about 34 doctoral degree programs. The UNT-Department of Chemistry offers diverse opportunities for undergraduate and graduate students interested in cutting-edge technology and research. We allow students to pursue their scientific creativity with guidance from leading chemistry faculty.

What was the inspiration for this cover design?

We show that the molecular geometry and structure are key components in governing the photoinduced charge separation and charge recombination processes in model donor–acceptor systems. This result was achieved by newly synthesizing and assembling the target multimodular donor–acceptor conjugate, and performing various physico-chemical and transient absorption studies at different time scales.

What future opportunities do you see?

Artificial photosynthesis holds great promise for harvesting sunlight for conversion into electricity or useful chemicals in an economically feasible way. Fundamental studies exploring structure–property–reactivity in model donor–acceptor compounds, viz., achieving control over the electron-transfer events upon photoexcitation and subsequent generation of long-lived charge-separated states of appreciable stored energy, are key in achieving this goal.

Acknowledgments

The authors thank University of North Texas and the Chemistry Department for their continuous support. This work is financially supported by the US-National Science Foundation.