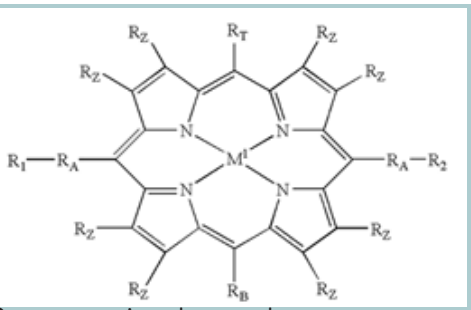
PENN CENTER FOR INNOVATION

Porphyrin-based nonlinear optical chromophores for optoelectronics

Synthesis, spectroscopy, and photophysics of multi-chromophoric Zn(II)-group 8 metal complexes

Inventors

Michael J. Therien, Professor of Chemistry



Representative chromophore structure.

STATE OF DEVELOPMENT

- Proof-of-concept testing and synthesis

INTELLECTUAL PROPERTY

USSN 7,445,845

DESIRED PARTNERSHIP

License

REFERENCE MEDIA

Uyeda HT et al. JACS, 2002, 124(46), p. 13806-13813.

APPLICATIONS

- Telecommunications
- Information storage
- Signal processing
- Photoelectric devices
- Multilayer polymer films

LEARN MORE

Sarah Johnson

johnsa@upenn.edu

215-746-7253

Docket # N2559

Problem

Electron and energy transfer processes are important chemical research areas. Detailed understanding of the mechanisms underlying these reactions can help lead to the design of synthetic enzymes that catalyze highly specific redox reactions, catalysts for alkane activation that feature electron transfer initiation, and photosynthetic reaction center mimics and light harvesting for solar energy storage and molecular electronic devices.

Solution

The Therien lab has developed new synthetic chromophores that can be used in nonlinear optical devices and optoelectronic applications. These chromophores feature a central (porphinato)zinc (II) unit and peripheral metal-bis-terpyridyl complexes coupled via a bridging moiety. There is a low-lying bridge (ZnP) excited state that is polarized exclusively along the long axis of the molecule. Metal-mediated cross-coupling is carried out to synthesize the compounds.

Advantages

- High light intensity emitted
- Improved long-range electron transfer kinetics
- High stability
- Large dynamic hyperpolarizabilities at telecommunication-relevant wavelengths