Light Harvesting Polymers for Energy Conversion and Solar Fuels

Meyer

Scientific Achievement

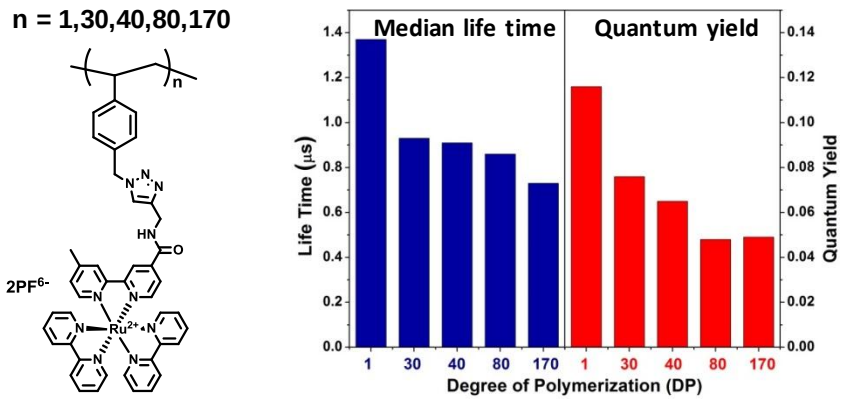
- **Controlled radical polymerization used to construct precisely defined polychromophores.**
- **Polychromophore light harvesting polymers act as sensitizers for TiO_2 DSSCs.**

Significance and Impact

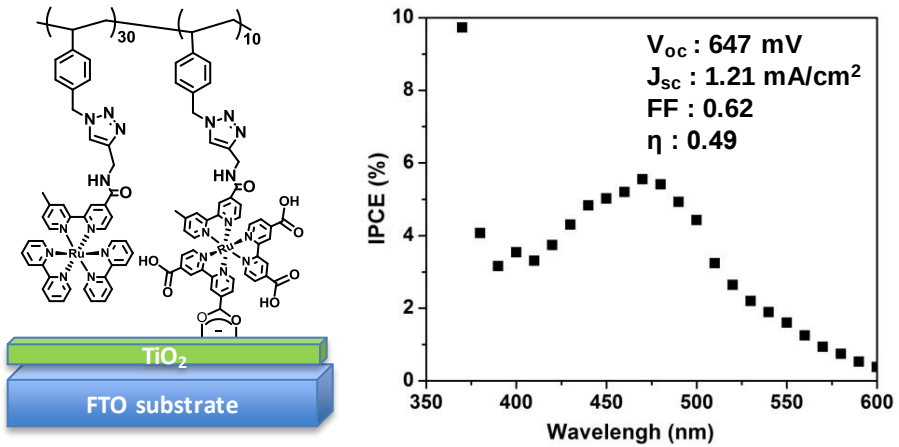
Developed novel polychromophore light harvesting polymers, resulting in efficient light collection and energy transport.

Research Details

- Polychromophores with precisely defined length and low polydispersity were prepared by using the Nitroxide Mediated Polymerization method.
- MLCT emission lifetime and quantum yield are influenced by polymer chain length. Effect is attributed to energy migration and exciton trapping.
- Polychromophores are applied as sensitizers for dye-sensitized solar cells; moderate light-to-electric conversion efficiency is observed.
- Work in progress seeks to incorporate water oxidation catalyst sites into the polychromophore arrays.



A series of Ru-polychromophores constructed with varying chain length and low polydispersity index (<1.4) (left) and photophysical studies as a function of polymer chain length (right).



Immobilization of a Ru-polychromophore onto a mesoporous TiO_2 film (left); Solar cell characteristics of Ru-polychromophore anchored TiO_2 films (right).

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Work was performed at the University of Florida, Georgia Institute of Technology and the University of North Carolina at Chapel Hill

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