

Mohamed El-Khouly



Research Area: *Photoinduced Electron Transfer of Molecular and Supramolecular Donor-Acceptor Systems: Toward Solar Energy Harvesting Systems*

EDUCATION

- 1991** *Bechlor of Science*, Department of Chemistry, Tanta University, Egypt
1996 *Master of Science*, Department of Chemistry, Tanta University, Egypt
2002 *Doctor of Philosophy*, Department of Chemistry, Tohoku University, Japan

Employment Experience

- 1998–2002** *Japan Government (MONBUSHO) Scholarship*, PhD, Tohoku University, Japan.
2003–2004 *Post-Doctoral Fellow, Venture Business Laboratory Post-Doctoral Fellowship*, Chiba University, Japan.
2004–2005 *Post-Doctoral Fellow, Center of Excellence (COE)*, Tohoku University, Japan
2005–2007 *Post-Doctoral Fellow, Japan Society for the Promotion Science (JSPS)*, Tohoku University, Japan.
2008–2008 *Visiting Researcher*, Bremen, Germany.
2008–2010 *Post-Doctoral Fellow*, JST, Osaka University, Japan.
2010–2011 *Post-Doctoral Fellow*, COE, Osaka University, Japan.

Research Interests

Using the basic chemistry of photosynthesis to harvest solar energy for use by humanity has long been a dream of photochemists. There are many approaches to achieving this goal. In my study, I utilize organic chromophores and electron and energy donors and acceptors that may be related to those found in natural reaction centers. These moieties are linked by covalent bonds that replace one role of the protein matrix by controlling donor-acceptor electronic coupling. The artificial photosynthetic systems absorb sunlight and use the resulting energy to carry out basic processes such as energy transfer, photoinduced electron transfer, and photoisomerization. Their design criteria are based on the principles of natural photosynthesis. The behavior of these molecules is studied using ultrafast laser spectroscopy, cyclic voltammetry, molecular orbital calculations, scanning probe microscopy, and other methods. Although such artificial reaction centers do not reproduce all aspects of the much more sophisticated natural reaction centers, they can approach the performance of the natural ones in terms of the quantum yield of charge separation, the fraction of photon energy conserved, and the lifetime of photoinduced charge separation.

Selected Publications

1. Mohamed E. El-Khouly, Dong Kyu Ju, Kwang-Yol Kay, Francis D'Souza, and Shunichi Fukuzumi. Supramolecular Tetrad of Subphthalocyanine-Triphenylamine-Zinc Porphyrin Coordinated to Fullerene as "Antenna-Reaction Center" Mimic: Formation of Long-Lived Charge-Separated State in Non-Polar Solvent. *Chemistry-A European Journal* 2010, 15, 4528-4523.
2. Mohamed E. El-Khouly, Ki-Jong Han, Kwang-Yol Kay, and Shunichi Fukuzumi. Stabilization of the Charge-Separated States of the Covalently Linked Zinc Porphyrin-Triphenylamine-[60]Fullerene: Spectroscopic, Electrochemical, Computational and Electron Transfer Studies. *ChemPhysChem*. 2010, 11, 1726-1734.
3. Mohamed E. El-Khouly, Yu Chen, Xiaodong Zhuang and Shunichi Fukuzumi, Long-Lived Charge-Separated Configuration of a Push-Pull of Archetype of Disperse Red 1 End-Capped Poly[9,9-Bis(4-Bis(diphenylaminophenyl)fluorene)]. *Journal of the American Chemical Society, Commun.* 2009, 131 (18), 6370-6371.
4. Mohamed E. El-Khouly, Jung Bok Ryu, Kwang-Yol Kay, Osamu Ito and Shunichi Fukuzumi, Long-Lived Charge Separation in a Dyad of Closely-Linked Subphthalocyanine-Zinc Porphyrin Bearing Multiple Triphenylamines. *The Journal of Physical Chemistry C* 2009, 113 (34), 15444–15453.
5. Mohamed E. El-khouly, Jung Hoon Kim, Kwang-Yol Kay, Chan Soo Choi, Osamu Ito, and Shunichi Fukuzumi, Synthesis and Photoinduced Intramolecular Processes of Light-Harvesting

Silicon Phthalocyanine-Naphthalenediimide-Fullerene Connected Systems. *Chemistry - A European Journal* 2009, 15 (18), 4528-4533.

6. Mohamed E. El-Khouly, S. H. Shim, Y. Araki, O. Ito, K.-Y. Kay. Effect of dual fullerenes on lifetimes of charge-separated states of subphthalocyanine triphenylamine fullerene Molecular Systems. *Journal of the Physical Chemistry* 2008, 112, 3910-3917.

7. Mohamed E. El-Khouly, E. S. Kang, K.-Y. Kay, C. S. Choi, Y. Aaraki and O. Ito. Novel silicon phthalocyanine-cored fullerene dendrimers: synthesis and prolonged charge-separated states with dendrimer generations. *Chemistry - A European Journal* 2007, 13, 2854-2863.

8. Mohamed E. El-Khouly, P. Padmawar, Y. Araki, S. Verma, Long Y. Chiang and O. Ito. Photoinduced processes in a tricomponent molecule consisting of diphenylaminofluorene-dicyanoethylene-methano[60]fullerene. *The Journal of Physical Chemistry A* 2006, 110(3), 884-891.

9. Mohamed E. El-Khouly, O. Ito, P. M. Smith and F. D'Souza. Inter and supramolecular photoinduced electron transfer processes of porphyrin fullerene and phthalocyanine-fullerene donor-acceptor systems. *Journal of Photochemistry and Photobiology C: Review* 2004, 5, 79 -104.

10. F. D'souza, G. R. Deviprasad, Mohamed E. El-Khouly, M. Fujitsuka and O. Ito. Probing the donor-acceptor proximity on the physico-chemical properties of porphyrin-fullerene dyads "tail-on" and "tail-of" binding approach. *Journal of the American Chemical Society* 2001, 123, 5277-5284.

11. S. Fukuzumi, H. Imahori, H. Yamada, Mohamed E. El-Khouly, M. Fujitsuka, O. Ito and D. M. Guldi. Catalytic effect of dioxygen on intramolecular electron transfer in radical pairs of zinc porphyrin-linked fullerenes. *Journal of the American Chemical Society* 2001, 123, 2571-2575.