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Photoirradiation Effect; Electric Field Effect; Optoelectronic Function; Electrical Conductivity; Intracellular Function; Fluorescence Lifetime Microscopy

We are “Photoelectrics and Photobioelectrics Lab (Figure 1)” of the Department of Applied Chemistry and Institute of Molecular Science, NCTU. Control of dynamics of molecules and molecular systems is extremely important to create novel functions in materials and biological systems. The use of light along with application of electric field as a tool to give stimuli has many advantages which originate from the characteristics of interaction among photon, molecules and electric field.

Our primary research interests include the following three major parts:

- (a) **Structure and Dynamics in the Photoexcited States:** Electronic properties in the excited state can be determined, based on the measurements of electroabsorption (E-A) and electro-photoluminescence (E-PL) spectra, and time-resolved E-PL measurements can be applied to examine the electric field effect on photoexcitation dynamics.
- (b) **Dynamics and Function of Biological System:** Intracellular environments and function can be examined using fluorescence lifetime microscopy (FLIM) (Figure 2). Intracellular dynamics and function in the presence of pulsed electric field will be also examined with FLIM (Figure 3).
- (c) **Materials Function:** Electrical conductivity of organic conductors and ionic solids will be examined with photoirradiation and/or application of electric (Figure 4), as a part of our strategy toward the realization of photoinduced superconductivity or photoinduced superionic conductivity (Figure 5).

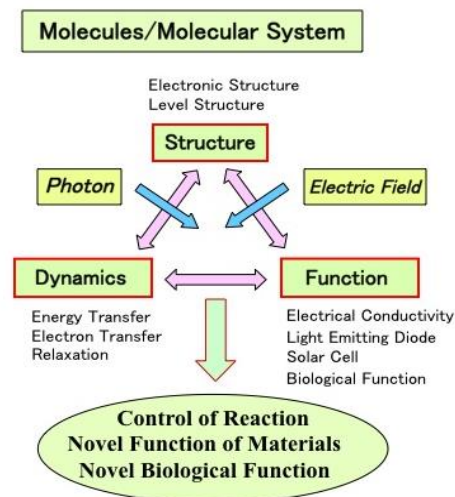


Figure 1

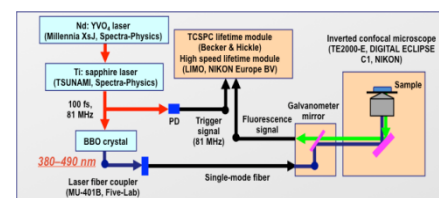


Figure 2

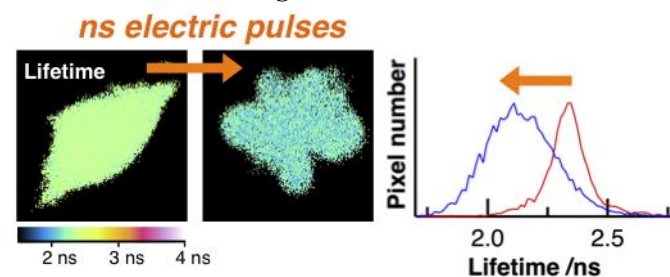


Figure 3

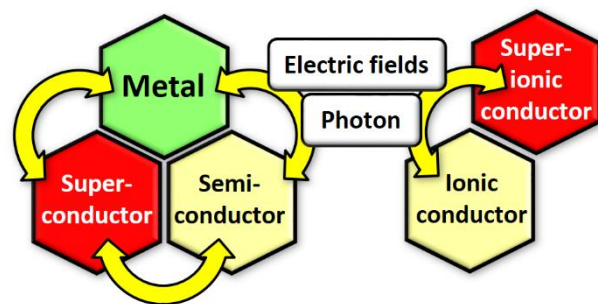


Figure 5

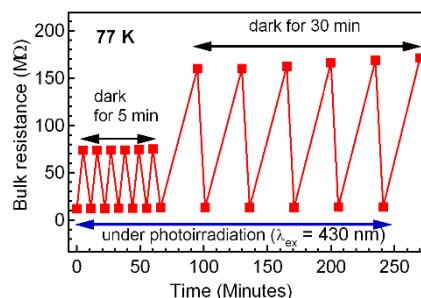


Figure 4