Frontier Chemistry Center
フロンティア化学教育研究センター

講演会

演 題：**The Optical & Electrical Properties at the Nanoscale: Exciton, Plasmon, Polaron and Synapses**

講 師：**Prof. Seonghoon Lee**
Department of Chemistry,
Seoul National University, Korea

日 時：2017 年 9 月 25 日（月）10:30~12:00

場 所：フロンティア応用科学研究棟 2 階 セミナー室 2

要旨：

The optoeletronic investigation of discrete quantum levels of giant artificial atoms and meta-molecules, organic semiconductors reveal **excitons** and **plasmons**, and **polarons**. The artificial atoms and meta-molecules, organic semiconductors were synthesized by wet chemical methods such as **molecular beaker epitaxy** (MBE). Colors originating from functional materials based upon those building elements are the results of absorption and emission due to quantum confinement effect, reflection, diffraction, and scattering. Practically, the thin flexible low-voltage driven R, G, B, and natural-look white light-emitting devices for next generation solid-state lightings and portable foldable displays were demonstrated. In addition, the first genuine UV-QLEDs were achieved and could open up the practical Al-plasmonics

Polarons transport formed by the strong electron-lattice interaction or band-like transport in organic semiconductors is the proper way to describe the motions of electrons and holes within any semiconducting or conducting materials. The reorganization energy and electron-transfer coupling matrix element between adjacent molecules, molecular order and packing are the factors influencing the transport in organic semiconductors. The transport through chemical structures such as a single molecule, organic nanofibers, & organic crystals was investigated.

The structural and functional plasticity of Aplysia mechanosensory presynaptic neurons has been studied in relation with the **mechanism underlying learning and memory.** The information transmission happens at the synapses. Our combined AFM-CLSM system is successfully adapted for measuring learning-related structural changes and the movement of synaptic molecules in the single live neuron through interaction force and fluorescence imaging. Our findings of the structural and functional plasticity of synaptic neurons shed light on artificial neural networks. How to change the weights of the synaptic connections between neurons is an essence in artificial intelligence or brain-like devices.

本講演は、大学院総合化学院『化学研究先端講義（修士課程選択科目）／
総合化学特別研究第二（博士後期課程選択科目）』の一部として認定されています。

連絡先：工学研究院応用化学部門　島田敏宏（内線：6576）

フロンティア化学教育研究センター