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

演 題：**Pentiptycene-Containing Oligo(*p*-Phenyleneethynylene)s**

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National Taiwan University, Taiwan

日 時：2015 年 7 月 31 日（金）14:45~16:15

場 所：フロンティア応用科学研究棟 2 階セミナー室 2

共 催：高分子学会北海道支部、北海道大学 Ambitious リーダー育成プログラム（ALP）

要旨：Oligo(*p*-phenyleneethynylene)s (OPEs) have been the key components in many π-conjugated systems and electronic materials. It is well documented that OPEs are strongly fluorescent and the π-backbone conformation (planarity) of OPEs plays a crucial role in determining the optical properties. However, torsion of the phenylene rings in OPEs is nearly barrierless (< 1 kcal mol^{-1}), which makes conformational engineering of OPEs a challenging task. On the basis of temperature-variable electronic spectroscopies, our studies on a series of pentiptycene-derived OPEs revealed that electron-withdrawing substituents facilitate the twisting of neighboring phenylene rings in OPEs, but electron-donating substituents favors a coplanar π-backbone. In addition, it is the iptycenyl electronic rather than steric effect that causes the observed backbone twist of the pentiptycene-containing OPEs. The substituent electronic effect on the π-backbone conformation of OPEs will be interpreted with the π-polarizability of phenylene rings. By incorporating Pt atom into the p-backbone, the conformational freedom is associated with fluorescence-phosphorescence dual emissive properties of OPEs. Besides the backbone conformation, intermolecular π–π interactions and electron donor-acceptor interactions that lead to fluorescence-color changes have been observed for pentiptycene-anthracene hybrid OPEs in the solid state. In particular, we discovered the phenomenon of force-induced fluorescence color memory, which provides a venue for multicolor fluorescence writing on thin solid films with mechanical forces. The structural and mechanistic aspects of these observations will be discussed.

「本講演は、大学院総合化学院『化学研究先端講義/総合化学特別研究第二』の一部として認定されています。」

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