TS-001 **<Invited Talk>**

Sensor Applications of Microporous Conjugated Polymers

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In 1991, Prof. Toshio Masuda of Kyoto University for the first time synthesized a representative of diphenylacetylene polymer derivatives, poly[1-phenyl-2-(p-trimethylsilyl)phenylacetylene] [PTMSDPA]. This polymer is highly soluble nevertheless a ultra-high molecular weight (Mw) of $>1.0\times10^6$ which showed excellent chemical, physical, mechanical properties [1]. As one of the most interesting features of PTMSDPA, Prof. Katsumi Yoshino of Osaka Univ. reported that this polymer emits an intense fluorescence (FL) in a visible region because of the effective exciton confinement within the resonant structure between the polyene pi-conjugated chain and side phenyl full-aromatic bulky groups [2]. Very recently, Prof. Ben-Zhong Tang of Hong-Kong Institute of Science and Technology clarified the idea that the FL emission of disubstituted acetylene polymer derivatives originates from intramolecular excimer due to the face-to-face stacking of the side phenyl groups [3]. Thus, to know what influence to intramolecular excimer emission in the film as well as to further understand how the intramolecular excimer forms in the film became more crucial in order to further precisely design the optimized molecular structure for highly emissive, substituted acetylene polymers in the solid state. In recent studies, we have focused our interests on the origin of the FL emission in order to expand our knowledge to developments of novel sensor applications. It was found that the intramolecular phenyl-pheyl stack structure of PTMSDPA in film was variable in response to various external chemical stimuli. Using PTMSDPA and its derivatives, we have developed various potential applications such as latent fingerprint identification, viscosity sensor, chemical-responsive actuator, gum-like soft conjugated polymer, and bioimaging. The details will be presented in the 49th KVS Symposium held in Pyong Chang city.

References

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