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Single-layer white-light polymeric luminescent film by plasma polymerization for light emitting diodes CHUN-CHIH CHANG, YI-HSING CHANG, YING-CHU CHEN, ARNOLD CHANG-MOU YANG, Department of Materials Science and Engineering, National Tsing Hua University, Hsinchu, Taiwan, KUO-CHU HWANG, Department of Chemistry, National Tsing Hua University, Hsinchu, Taiwan — Efficient white polymeric light-emitting diodes (PLED) were fabricated with a single active layer consisted of three-dimentional crosslinking π-conjugated system by plasma polymerization from conjugated monomers. As indicated by the FTIR, XPS UV-vis and PL spectra, the plasma polymer chains were constructed by various chromophores including naphthalene, phenyl, polyene and alkyl groups. Upon optical excitation, the light emission was characterized with a broad peak (FMHW $\sim$ 100 nm) located at 430 nm. In a PLED device, however, the energy transfer by Foster processes (FRET) between multiple host-guest pairs give rise to white emission located in CIE coordinates of (0.3439, 0.3369). This result illustrated the feasibility of large area contour coating of single-layer white-light luminescent polymers for LEDs by simple plasma polymerization methods. This work is supported by National Science Council of Taiwan.

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