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Carrier Conduction and Light Emission by Modification of Poly(alkylfluorene) Interface under Vacuum Ultraviolet Light Irradiation[1] YUTAKA OHMORI, HIROTAKE KAJII, DAIKI TERASHIMA, YUSUKE KUSUMOTO, Osaka University — Organic field effect transistors (OFETs) have been extensively studied for flexible electronics. The characteristics of poly(9,9-dioctylfluorenyl-2,7-dyl) (F8) modified by thermal or light are strongly dependent on the carrier transport and optical characteristics. We investigate all solution-processed OFETs with Ag nano-ink as gate electrodes patterned by Vacuum Ultraviolet (VUV) (172 nm). Bi-layer gate insulators of amorphous fluoro-polymer CYTOP (Asahi Glass Corp.) and poly(methylmethacrylate) (PMMA) were used. Top-gate-type OFETs with ITO source/drain electrode utilizing F8 or poly(9,9-dioctylfluorene-co-benzothiadiazole) (F8BT) as an active layer were fabricated, and investigated the carrier conduction and emission characteristic. Without VUV irradiation, both OFETs showed the ambipolar and light-emitting characteristics. On the other hand, F8 devices with VUV exhibited only p-type conduction. The quenching centers were generated in F8 layer by VUV irradiation, which are related to the electron trap sites at the interface. OFETs with F8BT showed both p- and n-type conduction even after VUV. F8BT suffers less damage by VUV and maintain light emission. Light emitting transistors were realized utilizing F8BT patterned by VUV irradiation.

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