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**Multilayer polymer devices: light emitting diode and vertical hot carrier transistor** HSIN-FEI MENG, National Chiao Tung University, SHENG-FU HORNG, CHAIN-SHU HSU, SHIN-RON TZENG, YU-CHIANG CHAO, SYUAN-LIN YANG — Two new devices based on polymer multilayers are presented: charged-balanced LED and hot carrier transistor. 1. An intermediate liquid buffer layer is introduced to overcome the dissolution problem of solution-processed multilayer polymer light-emitting diodes. This method can be applied to arbitrary combinations of polymers with no restriction on solvents. As an example, a hole-blocking layer is successfully spin-coated on the emissive polymer layer. Three typical p-type polymers, The electron-hole balance is improved by the addition of hole-blocking layer. The electroluminescence efficiency can be increased up to 5 times, while the luminance up to 7 times. Electron-blocking layer is applied to blue polyfluorene copolymer and the brightness is as high as  $30,000 \text{ cd/m}^2$  while the yield is  $4 \text{ cd/A}$ . 2. Metal-base hot-carrier transistor with conjugated polymer emitter and collector is demonstrated. The device is fabricated by multiple spin-coating with the metal base sandwiched between two polymers. A thin insulating layer of LiF is inserted between emitter and base to enhance the hot carrier kinetic energy and reduce the mutual dissolution. Using poly(9-vinylcarbazole) as the emitter, Al as base, and poly(3-hexylthiophene) as the collector, common-emitter current gain of 26 is obtained with operation voltage as low as 5V.

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