

## Self-organized gradient hole injection layer for polymer light-emitting diodes

이태우\*, 정영수, 권오현, 박종진  
삼성종합기술원  
(taew.lee@samsung.com\*)

Polymer light-emitting diodes (PLEDs) can be one of the most desirable solutions for large area, high resolution, fast response, and full-color flexible displays based on low-cost solution process, which are currently difficult to achieve by using other types such as liquid crystal or electrophoretic displays. Although a great deal of progress has been made in solution processed PLEDs, the reliability of PLED device is still much behind that of vacuum deposited small-molecule-based organic light-emitting diodes (SM-OLED) and still does not meet the requirements for commercialization. Molecular interface engineering between an anode surface and the overlying organic layer can be one of the promising solutions to tune the electronic properties and to prevent the adverse effects of the anode on the device stability. Here, we demonstrate a new approach to form gradient hole injection layer in PLED. Single spincoating of hole-injecting conducting polymer compositions with a perfluorinated ionomer results in gradient workfunction through the layer by self-organization, which leads to remarkably efficient single layer PLEDs (~21 cd/A). The device lifetime was significantly improved (~50 times) compared with the conventional hole injection layer, poly(3,4-ethylenedioxythiophene)/polystyrene sulfonate.