

303

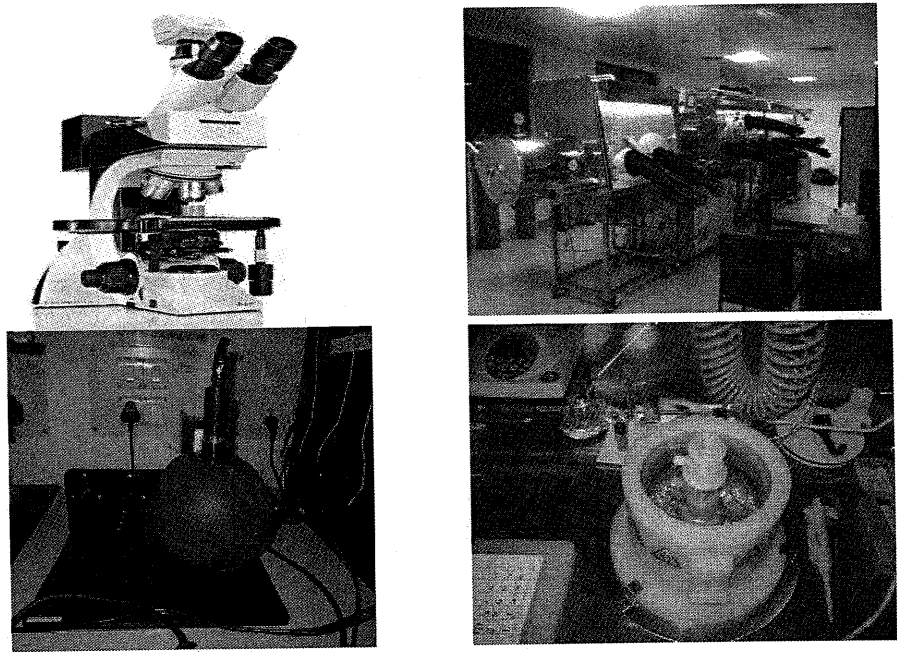
DST/TSG/ME/2009/11

Completion report

Design and Development of Organic Light Emitting Diodes (OLED) and Photovoltaic (PV) devices

Vision: To develop large area organic light emitting diodes.

Facilities: Polarizing microscope was procured directly from this project. The inert atmosphere Glove box facility for fabricating OLED devices, LED tester, and spin coater were extensively used while implementing this project.



Research Activity: Several devices were fabricated based on a series of molecules and conjugated polymers that were selected based on their well known properties.

OLEDs: We have successfully fabricated and characterized single as well as multilayer Organic Light Emitting Diode (OLED) using both small molecule and polyfluorene based polymer as an emissive material. Different sizes of single pixel devices viz. 2 mm x 2 mm, 5 mm x 5 mm, 1 cm x 1 cm and 1.2 cm x 1.2 cm were fabricated on 1 inch x 1 inch substrate. However, for common anode multi pixel devices 2 mm x 2 mm and 3 mm x 3 mm devices were fabricated.

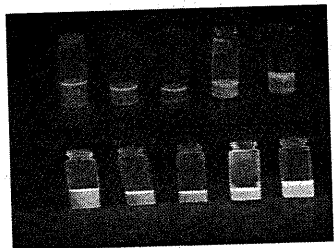


Figure 1: Polyfluorene based luminescent polymers synthesized in our laboratory

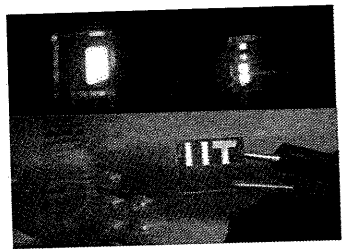


Figure 2: OLEDs developed in our lab

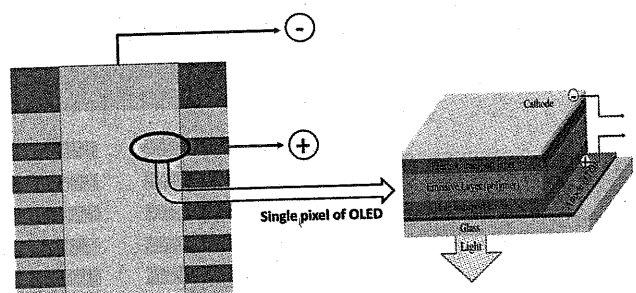


Figure 3: Basis device structure

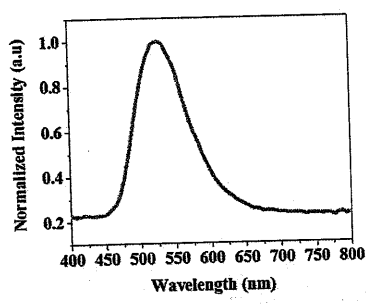


Figure 4: EL spectra of Alq3 based device

Large area device fabrication of upto 1 inch x 1 inch was suggested by the expert committee in a review meeting held at SRM University, Chennai in October 2013. Based on these suggestions the below large area devices were fabricated and demonstrated. These devices could be fabricated with both polyfluorene based materials as well as Alq3 blends where white light was obtained. The devices were stable for more than 8 weeks.

ITO/PEDOT:PSS/PF-DPA/ Alq3/Al



Figure 5: PF-DPA polymer OLED device operating in a glove box