

Effects of plasma induced UV on the damage of organic thin films

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Many organic devices are subject to degradation caused by permeation of environmental gases or liquids, such as oxygen and water vapor in the atmosphere. So, the organic devices are usually encapsulated in order to prevent degradation. The encapsulation film of organic devices can be deposited using a vacuum process, such as sputtering, chemical vapor deposition (CVD), metal-organic chemical vapor deposition (MOCVD), plasma enhanced chemical vapor deposition (PECVD) evaporation.

We have found that some of the devices have been damaged by the plasma used in depositing the passivation film. We have investigated the optical damage of the organic devices by the UV within the plasma. This Alq3 films were deposited on the Indium tin oxide (ITO) anode using a thermal evaporation and then, cover the Quartz or ITO Glass on the Alq3 film and be exposed to the argon plasma. Finally, lithium fluoride layer and aluminum cathode were deposited. J-V characteristics of Alq3 devices decreased as the plasma exposure time increases. UV exposed device need 14.6 V and 6.2 V to achieve 100 mA/cm², respectively. This results suggest that ITO film on Alq3 organic layer blocks the absorption of UV in the Alq3 film, resulting in the reduced damage of Alq3 films.

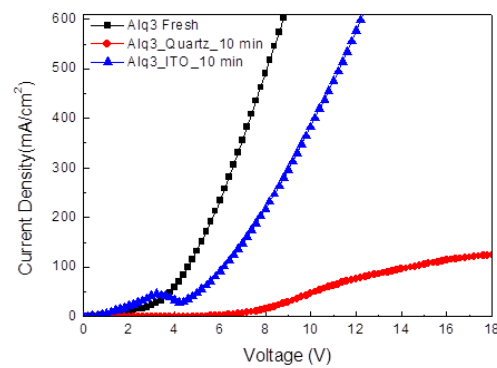
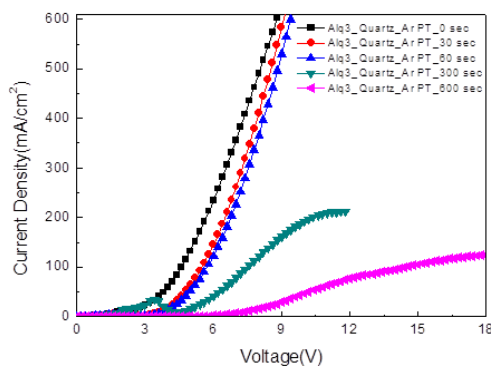


Fig. 1. J-V Curve of UV damaged OLEDs

Fig. 2. J-V Curve of OLEDs preventing UV damage

References

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