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Fabrication of conjugated polymer light-emitting devices prepared by plasma enhanced chemical vapor deposition of naphthalene

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Polymer light-emitting devices were fabricated utilizing plasma polymerized thin films as emissive layers. These conjugated polymer films were prepared by RF Plasma Enhanced Chemical Vapor Deposition (PECVD) using naphthalene as monomer by applying different powers. ITO/PEDOT: PSS/ plasma polymerized Naphthalene/Alq3/Al developed devices, showed a broadband emission peak of Electroluminescence (EL) with center at 570 nm. The turn on voltage of devices was about 6 V. By increasing the power, photoluminescence (PL) and UV-Vis spectra showed a red shift. PL emission peaks shifted from 492 nm to 562 nm respect to the power increase from 50 to 200 w. Fourier transform infrared (FTIR) and Raman spectroscopies confirmed that a conjugated polymer film was developed by ring opening process during the plasma polymerization. By increasing the power, ring opening process and crosslinking density raised and chain length growth was occurred consequently.

Keywords

light emitting device

RF PCVD

plasma polymerized naphthalene

Electroluminescence

photoluminescence