

Synthesis and Characterization of Light Colored Polyimide/SiO₂ Nano Composite for Flexible Substrates

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A new type of polyimide (PI) / silica (SiO₂) hybrid composite films were prepared by blending nano-size silica particle with synthesized fluorinated PI. PI were synthesized from 4,4'-bis(4-amino-2-trifluoromethylphenoxy)diphenyl ether (BATFE) with 4,4-hexafluoroisopropylidenediphthalic anhydride (6FDA) through a typical two-step polymerization method. This synthesized low colored PI were blended with nano sized silica (7nm) changing the amount of the silica from 0 to 6 wt%. These composite films were successfully characterized for confirming the synthesis by the FT-IR and ¹H-NMR. And the thermal analysis were also evaluated using the TGA and DSC while DMA and TMA for the thermo-mechanical analysis. Ultraviolet-visible (UV-vis) spectra, Haze data were obtained for measuring the optical properties such as the transparencies and the degree of the color of the composite films. The morphology of the films were investigated by the X-Ray Diffractometer (XRD) analysis. Through these evaluations, we found that the light colored PI / SiO₂ nano composite could be the one of good candidates as the transparent substrates for the flexible displays such as Flexible OLED or e-Paper.