Flexible Substrates based on Novel Fully Aliphatic Polyimidosiloxanes

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Colorless transparent polyimides (PIs) have been achieved by the introduction of fluorine group into the polymer chain. It leads aromatic PIs to be applied in optical components, as well as the extension of application fields. Fully aliphatic and alicyclic polyimide(API) are currently being considered for their applications in optoelectronics and interlayer dielectric materials, thanks to their higher transparencies and lower dielectric constants. In our previous work[1], we synthesized novel fully aliphatic polyimidosiloxanes containing cyclic aliphatic/adamantyl group and siloxane moieties (APISiO) (Fig.1). It was found that the PIs containing appropriate ratio of cyclic aliphatic/adamantyl moieties together with flexible aliphatic siloxane groups exhibit good thermal and mechanical stabilities, solubility, fair transparency, and low dielectric constant (2.4–2.7). This time, we used the APISiOs as colorless flexible substrates for OLEDs. We prepared a variety of APISiO substrates by changing the ratio of siloxane moieties. The APISiO substrates with the thickness of 100 μm have high glass transition and decomposition temperatures, good transmission, and low optical loss. Indium tin oxide (ITO) thin films were deposited onto the substrates using r.f. magnetron sputtering system changing the deposition conditions such as temperature and deposition time[2]. We measured the morphologies and surface roughness of substrates, sheet resistance, transparency and calculated the grain-size of ITO using AFM, XRD, and UV-Visible spectroscopy to understand the interaction between inorganic electrodes and organic substrates.

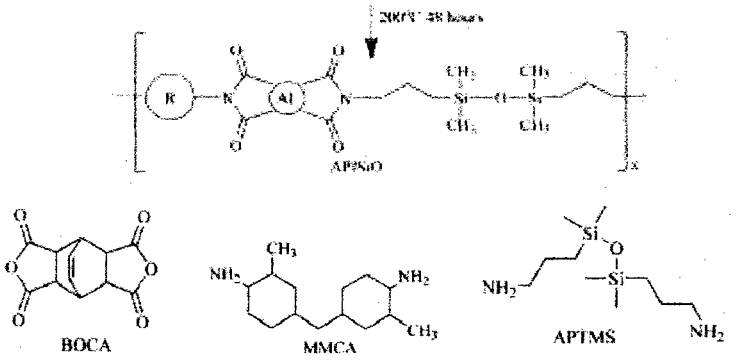

Fig. 1

References

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