PL0003

# Plasma Polymerized Thin Films Materials: Synthesis, Characterization, Application Tests for Flexible Electronic Devices

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Pure organic and organic-inorganic hybrid polymer-like thin films have been deposited on glass and silicon substrates under the several conditions such as different temperature, precursor flux, and RF power by using plasma enhanced chemical vapor deposition(PECVD) method. Simple organic monomers such as *para*-xylene, thiophene, cyclohexene, and ethylcyclohexane as well as TEOS (tetraethylorthosilicate) were respectively utilized as organic and inorganic precursors, and hydrogen and Ar (argon) were used as a bubbler and carrier gases, respectively. In order to compare the differences on the electrical and the optical properties of the plasma polymerized thin films, we grew the pure organic and hybrid polymer-like thin films under the conditions of various RF (radio frequency using 13.56 MHz) powers in the range of 20~100 W and deposition temperatures with different flux. The as-grown polymerized thin films were characterized by FT-IR, UV-Visible spectroscopy, SEM/TEM, AFM, and nano-indentation. The result of FT-IR and UV-Visible measurement showed that the plasma polymerized thin films have highly cross-linked density with increasing RF power, TEOS ratio, and deposition temperature. The data of AFM, SEM/TEM, and hardness also showed that the polymer films with smooth surface and sharp interface as well as good adhesion. With these films, we carried out some application tests for the next generation of flexible electronics such as low-k dielectric interlayers, flexible organic light emitting diodes(FOLEDs), and organic thin film transistors(OTFTs).

**Keywords**
plasma polymers
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