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ORGANIC POLYMER THIN FILMS DEPOSITED ON SILICON AND COPPER BY PECVD METHOD AND CHARACTERIZATION OF THEIR ELECTROCHEMICAL AND OPTICAL PROPERTIES

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Polymer-like thin films have been deposited on glass, silicon and copper substrates at temperature range of room temp. to 100 °C by plasma enhanced chemical vapor deposition (PECVD) method using Cyclohexane(C_6H_{12}) as a precursor for analysis their electrochemical and optical characteristics. Cyclohexane was utilized as organic precursor, and hydrogen and Ar(argon) were used as a bubbler and carrier gases, respectively. In order to compare the difference of the corrosion resistant and the optical properties of the plasma polymerized organic thin films with conditions of various RF (radio frequency using 13.56 MHz) power in the range of 20~50 W and deposition temperature. The optical and electrical properties of the as-grown plasma polymerized thin films were analyzed by ellipsometry, UV-Visible spectroscopy , I-V and C-V curves. The corrosion protective abilities of Cyclohexane were also examined by AC impedance measurements in 3.5 wt.% NaCl solution. We found that the corrosion protection efficiency(P_k), which is one of the important factors for corrosion protection in the interlayer dielectrics of microelectronic devices application, was increased with increasing RF power. The highest P_k value of plasma polymerized cyclohexane film was (85.26% at 50 W), AFM and SEM showed that the polymer films with smooth surface and sharp interface could be grown under various deposition conditions.