

Optical and Electrical Properties of Aromatic-Bridged Silsesquioxane Thin Films

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Materials containing aromatic groups have been applied on such field as light emitting diodes (LEDs), solar cells, and thin-film transistors (TFTs) basing on their optical and electrical properties. In this work, thin films were fabricated from two different precursors: 4,4'-bis(trimethoxysilyl)biphenyl and 4,4'-bis(trimethoxysilylmethyl)biphenyl by sol-gel process followed by spin-coating on silicon wafer (Si-wafer). In order to clarify the interaction between aromatic groups, the differences in optical and electrical properties between aromatic-bridged silsesquioxane thin films and those of their precursors were investigated. Copolymer thin films synthesized from methyltrimethoxysilane (MTMS) and aromatic-bridged precursor were also fabricated and investigated in order to investigate the properties as changing the distance between aromatic groups. The distance between aromatic groups was controlled by changing the mole ratio of MTMS and aromatic-bridged precursor in synthetic process. Ultraviolet-visible (UV), photoluminescence (PL) spectroscopy, and capacitance-voltage (C-V) curve were representatively employed for mentioned purposes.