Temperature Effect on Structural and Optical Characteristics of Solution-processed Polytriarylamine (PTAA) Thin Films for Optoelectronic Applications

ABSTRACT

Polytriarylamine (PTAA) is a promising yet trending organic semiconductor material in which has unique characteristics that are low-cost fabrication, flexible and stable in room condition. The unique characteristic of PTAA thin films have attracted researchers to explore more on its ability as future green technology solutions. In this works, the effect of annealing temperature towards PTAA thin films are focused. PTAA thin films is fabricated by solution processed technique and sintered onto the glass substrate by spin coating method. The spin coating speed are 1000 RPM to 5000 RPM. The PTAA thin films are further annealed for an hour with temperatures of 80 oC, 120 oC and 150 oC. It is shown that grain size of thin films are increasing as the temperature increased based on XRD analysis. As for 1000 to 5000 RPM, the highest grain size obtain are 26.46 nm, 31.34 nm, 37.19 nm, 39.96 nm and 42.72 nm, respectively. Optical characteristic also reveals that band gap energy value is perpendicular to the increasing in temperature obtain from the UV-Vis spectrum. The results strongly show that annealing temperature had significantly affected both structural and optical properties of PTAA thin films.