ABSTRACT

Thin-film research has been of great interest in technology fields such as electronics, spintronics, optoelectronics, and energy storage. Tungsten Disulfide (WS_2) has attracted optic and optoelectronic properties, and it is promising for the applications of optoelectronic devices such as photodetectors, light-emitting devices (LEDs), and lasers. The characterization of optic and optoelectronic properties on multilayer WS_2 nanomaterials are still needed the further researches. This study investigates the effect of light intensity on the optic properties of WS_2 when it is exfoliated on different solvent, and also the optoelectronic properties multilayer WS_2 on the flexible substrat. This study used the WS_2 in the IPA/water and NMP solvent. For optoelectronic properties measurement, the WS_2 was deposited on PET substrates using drop-casting method. The optoelectronic properties are observed by measuring the current changes for various voltage with and without light illumination. The I-V curve characteristics shows that the WS_2 sample tends to be insulator when the voltage were varied from -5 V to 5 V. The current are in range of -4.6 nA to 5.4 nA, and -2.8 nA to 3.7 nA when the measurement was conducted without and with light irradiation, respectively. The current decreased when 20 % mechanical strain was applied. The photoluminescence spectra were observed at 634 nm, 611 nm, and 566 nm when the sample was excited by a laser with a wavelenght of 532 nm. The photoluminescence spectra were found to wavelength dependent. In addition, this study also carried out the characterization of UV-Vis, PSA, SEM, dan EDX. Uv-Vis characteristics showed the peaks of exciton A and B at 638 nm and 529 nm, respectively, when WS_2 was exfoliated for 3 hours. The peaks of exciton A and B are shifted to 634.9 nm and 533 nm, respectively, when WS_2 was exfoliated for 8 hours. The average size of WS_2 was 124.2 nm when it was characterized by PSA.

Keywords: *WS_2, optoelectronic, optic, photoluminescence, dropcasting, Uv-Vis, PSA, SEM, EDX*