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Photocurrent studies on multi-walled WS_2 nanotube devices JOHN MATHEW, GOBINATH JEGANNATHAN, SAMEER GROVER, SUDIPTA DUBEY, PRATIKSHA DONGARE, MANDAR DESHMUKH, DCMP&MS, Tata Institute of Fundamental Research, Mumbai, India — Multi-walled WS_2 nanotubes were used for transport and photo response studies. The nanotubes were structurally characterized by scanning electron microscopy, high resolution transmission electron microscopy and Raman spectroscopy. Nanotube devices in field effect transistor geometry were fabricated on Si/SiO_2 substrates using nano lithography techniques. I-V measurements of these devices were carried out in ambient conditions. A confocal microscope system was used to study the photo response of the devices to 633 nm and 532 nm laser wavelengths using lock-in technique. Photocurrent map of the devices was obtained and studied as a function of applied bias voltage and gate voltage. The devices showed non-linear increase in photocurrent with increasing bias voltage and light intensity. Further, heterostructure devices of graphene and WS_2 nanotubes were fabricated for enhanced field effect behavior. Results of the photo response studies of these devices will also be presented.

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