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Jackson, November 22nd, 2019.

To
Editors of The Journal Semiconductor Science and Information Devices (SSID),

Dear Editors SSID,

Please, find in the enclosed submission of the manuscript titled "**Intrinsic Photoconductivity of few-layered ZrS_2 Phototransistors via Multiterminal Measurements**" for your consideration as a regular article in SSID. In this manuscript we unveil a detailed study on the optical transport of few-layered ZrS_2.

Optoelectronic properties of two-dimensional materials particularly transition metal dichalcogenides (TMDS) are one of the center stages of the current research. Each 2D materials posses distinct electronic and optical properties due to their tunable band gaps as a function of number of layers. Among them ZrS_2 is one of the very less studied materials for its electrical and optical properties. We synthesized the ZrS_2 single crystal using chemical vapor transport (CVT) technique and fabricated the few-layered FET devices on the Si/SiO_2 substrate using mechanical scotch tape technique. The electrical and optical properties are measured via multi-terminal configurations using the 532 nm laser source as a function of drain-source voltage, gate voltage and optical powers. We extracted photocurrent responsivity (R) and external quantum efficiency (EQE) from the device using 2-terminal and 4-terminal methods. We observed n-type FET on few-layered ZrS_2, high photoresponsivity up to 6 A/W and EQE 1400% at applied low bias voltage and low incident optical power. We further extracted the photo dark current ratio (PDCR) and detectivity (D) of few-layered ZrS_2 and the maximum value of PDCR found to be 275 and detectivity is 10^9 Jones. The responsivity value obtained from our device is two order magnitude larger than the recently reported photocurrent responsivity on same materials by M. Mattinen et al. (*Chemistry of Materials* 31, 5713 (2019)).

Given that our manuscript undergoes detail optical characterization, supported by Raman modes, we sincerely believe that it should be of interest to the editors, readership of he journal of SSID and 2D community.

The manuscript contains five embedded figures, and a supporting information file containing two additional figures. We remain at your entire disposal for additional information.

Sincerely,

Nihar Pradhan