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Synthesis and Photoresponse of Few Layer Liquid Phase Exfoliated Molybdenum Disulphide (MoS_2) Flakes[1] SUJOY GHOSH, BALEESWARAIAH MUCHHARLA, ANDREW WINCHESTER, Southern Illinois University, Carbondale, IL-62901, SIMIN FENG, ANA LAURA ELIAS, NESTOR PEREA LOPEZ, Pennsylvania State University, University Park, PA-16802, SWASTIK KAR, Northeastern University, Boston, MA 02115, MAURICIO TERRONES, Pennsylvania State University, University Park, PA-16802, Research Center for Exotic Nanocarbons, Shinshu University, Nagano-city, Nagano, Japan, SAIKAT TALAPATRA, Southern Illinois University, Carbondale, IL-62901 — We report on the temperature dependent photo response of thin films of MoS_2 consisting of few layered flakes obtained by liquid phase exfoliation of bulk MoS_2 powder. We found that under a constant laser power (wavelength = 658 nm) the photocurrent (I_{ph}) increases with increasing temperature and reaches a maximum value of $I_{ph(max)}$ at $T=T_m$ within the studied temperature range (330K $<T<$25). Thereafter, I_{ph}, decreases with further increase in temperature and also becomes temperature independent at low temperatures. Further, it was found that in such films $I_{ph} \sim$ (laser intensity)$^{\gamma}$ with $0.5 <\gamma <1.0$. These findings will be presented and discussed under various available models related to photoconductivity in semiconductors.

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Sujoy Ghosh
Southern Illinois University, Carbondale, IL-62901

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