Abstract Submitted
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Temperature and Power Dependent Photoluminescent Spectroscopy of MoS_2 M. WATSON, Towson Univ, J.R. SIMPSON, Towson Univ, NIST, R. YAN, H.G. XING, X. WU, T. LUO, Notre Dame Univ, S. BERTOLAZZI, J. BRIVIO, A. KIS, EPFL, A.R. HIGHT WALKER, NIST — We report temperature and power dependent photoluminescence (PL) of molybdenum disulphide (mos). Mechanical exfoliation of mos, from bulk provides single-layer flakes which are then transferred either to sapphire substrates or suspended over holes in Si/Si_3N_4. We measure temperature dependence from $\approx$100 K to 400 K and power dependence from $\approx 6\,\mu$W to $\approx$7 mW using an Argon laser at 514.5 nm and a HeNe laser at 632.8 nm. The PL spectrum exhibits a main exitonic peak(A) at $\approx$1.87 eV which consist of both neutral excitons and charged trions (A- or A+) [1]. The A exciton peak and the A- exciton peak redshift and broaden with increasing temperature and power. Along with the A peak, we observe a lower energy bound exciton (BE) that is likely related to defects. The BE,a broad peak centred at $\approx$1.7 eV, linearly redshifts and narrows with increasing power. The power dependence of both the main and bound peak saturates above 0.5 mW. Raman temperature and power dependence will also be discussed [2].

[1] KF. Mak et al. Nat. Mat 12,207(2013).
[2] R.Yan and J.R.Simpson, S. Bertolazzi and J. Brivio, M. Watson, X.Wu and A. Kis, T.Luo, H.G.Xing, A.R. Hight Walker, (submitted ACS Nano 2013)

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