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Ambipolar light emitting transistors on transition-metal dichalcogenides YIJIN ZHANG, RYUJI SUZUKI, YOSHIHIRO IWASA, The Univ of Tokyo — Transition-metal dichalcogenides (TMDs) are known to show ambipolar transistor operation, in which both electron and hole can transport through TMD channel materials [1]. As widely investigated in organic transistors, ambipolar transistor has additional functionality of the efficient light emitting source by simultaneously introducing electron and hole in the channel, forming a bias tunable p-n junction [2]. Recently, tunable yet stable p-n junction has been realized in MoS2 using a device structure of electric double layer transistor (EDLT), taking advantage of liquid gate dielectric [3]. We fabricated EDLT devices with tungsten diselenide (WSe2), molybdenum diselenide (MoSe2), and molybdenum disulfide (MoS2) as channel materials, and observed electroluminescence (EL) from both monolayers and multilayers. The peak energy suggests that EL occurs at K point in the momentum space even in multilayer samples, in contrast with band modulation from monolayer to multilayers [4]. Such a light emitting device will be a fundamental device in opto-valleytronics application. [1] Y. J. Zhang et al. Nano Lett. 12, 1136 (2012) [2] J. Zaumseil et al. Nat. Mater. 5, 69 (2006) [3] Y. J. Zhang et al. Nano Lett. 13, 3023 (2013) [4] A. Splendiani, et al. Nano Lett. 10, 1271 (2010)

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