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Experimental determination of the massive Dirac-fermion parameters in MoS_2, $MoSe_2$, WS_2, and WSe_2 BEOM SEO KIM, Seoul Natl Univ, JUN-WON RHIM, Max Planck Institute, BEOMYOUNG KIM, Pohang Univ of Science and Technology, CHANGYOUNG KIM, Seoul Natl Univ, SEUNG RYONG PARK, Incheon Natl Univ — The physics associated with group 6 transition metal dichalcogenides (TMDs) MX_2 (M = Mo, W; X = S, Se) is one of the most intriguing issues in condensed matter physics. These materials have several interesting aspects, especially the direct to indirect band gap transition and spin-orbit interaction (SOI) induced spin band splitting at the K point. Recently, one reported a minimal band model, called massive Dirac-fermion model, for K point of the monolayer MX_2 Brillouin zone. There are several parameters in this model obtained by calculations, not by experiment, until now. Here we report the parametric studies on MX_2 using angle resolved photoemission spectroscopy (ARPES). We factor out the massive Dirac-Fermion parameters from the bulk MX_2, not monolayer. For confirming the accurate experimental values, we performed the photon energy dependence experiment to find the exact Γ point and in-situ potassium-dosing experiment were performed for each MX_2.

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