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Depin MoS₂ Fermi Level via One-Dimensional Contact¹ ZHENG YANG, CHANG HO RA, WON JONG YOO, SAINT, Sungkyunkwan University, NANO DEVICE PROCESSING LAB TEAM — In this work, we depin MoS₂/metal contact using MoS₂/metal one-dimensional (1D) contact via controllable plasma etching. An intrinsic MoS₂/Pd 1D contact FET fabricated in this study shows ambipolar behavior. While an intrinsic MoS₂/Mo 1D contact FET fabricated shows n-type behavior with a two-probe field-effect electron mobility of 96 cm²V⁻¹s⁻¹. With four-probe transport measurement, we obtain a maximum field-effect hole mobility, 9 cm²V⁻¹s⁻¹ at 300 K. At 70 k, it increases to around 393 cm²V⁻¹s⁻¹. With the use of this MoS₂/metal 1D contact, we successfully demonstrate an inverter formed on intrinsic MoS₂, whose gain is ~14.7 at V_{SD} = 5 V. Our work opens a door to simply realizing complementary integrated circuitry, based on high performance intrinsic MoS₂.

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