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Metal Contacts on Semiconducting Two-Dimension Crystals HAN LIU, ADAM NEAL, YUCHEN DU, PEIDE YE, School of Electrical and Computer Engineering, Purdue University — Semiconducting 2-D crystals, such as MoS_2, WSe_2, are viewed as promising candidates for electronic applications for their high carrier mobility, thermal stability, compatibility to CMOS process, and superior immunity to short channel effects. However, with the difficulty in ion implantation, the metal contacts on 2-D crystals are yet with large contact resistance, thus eliminates further device performance. We study different metal contacts from low work function to high work function metals on MoS_2 and WSe_2 crystals with various thicknesses and discuss the Fermi level pinning at the metal/semiconductor interface. Effective Schottky Barrier Heights (SBHs) are also measured. Molecular doping and dual-side contacts metals are performed as two tentative solutions to reduce the effective SBHs, and high-performance of field effect transistors are achieved by reduced contact resistance.

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