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Engineering MoS2 contact by inserting an ultrathin tunnelling barrier EN-MIN SHIH, XU CUI, DONGJEA SEO, YOUNGHUN JUNG, REBECA RIBEIRO, JAMES HONE, CORY DEAN, Columbia Univ — Semiconductor transition metal dichalcogenides (TMDs) are 2D semiconductors that host attractive transport properties such as unconventional quantum Hall effect and spin-valley physics. However, metal contacts typically result in a Schottky barrier, making it difficult to access fundamental properties of the intrinsic charge transport. In this report, we utilize an ultrathin tunneling layer into the contact interface to achieve ohmic contact to MoS_2 monolayer and bilayer. We are able to reduce Schottky barrier height down to 10 meV and get a linear I-V response down to 1.7 K with low contact resistance. This tunneling structure does not rely on low work function metals and phase engineered MoS_2, which makes it promising in practical application.

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