

Achieving Low Contact Resistance in MoS₂ nFET with van der Waals epi-Au

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Abstract

In recent years, contact metals for MoS₂ nFETs with prominent performance have predominantly been semimetals. However, semimetals with low melting points (m.p.) encounter electrical property degradation under thermal stress. Here, we proposed gold (Au) with higher m.p. as the contact metal for MoS₂ nFETs. Utilizing gold-assisted transfer and potassium iodide (KI) solution etching, we demonstrated single-crystalline Au patterns on MoS₂, which indicates the preserved epitaxy of Au after the consecutive processes. Moreover, low contact resistance (R_c) of 358 $\Omega \cdot \mu\text{m}$ between epi-Au and MoS₂ was extracted by the transfer length method (TLM), showing the potential of Au contact for robust MoS₂ nFETs.

Keywords - MoS₂, epitaxy, gold, nFET, contact resistance.