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Self-aligned high transconductance CVD graphene transistor YUCHI CHE, ALEXANDER BADMAEV, ZHEN LI, CHONGWU ZHOU, University of Southern California — Exceptional electronic properties of graphene make it a highly promising material for high-speed electronics. However, the design and practical realization of graphene transistors are still challenging, which limit the potential of graphene. In this work, we present a novel, practical, and highly scalable method for the fabrication of self-aligned graphene transistors. Large-area single-layer graphene films were grown on copper foil and were transferred onto 12 inch Si wafers. Furthermore, in order to achieve wafer-scale fabrication of graphene transistors with high yield, we developed a self-aligned fabrication approach by standard lithographical methods. The fabricated transistors with gate lengths in the range of 110 to 170 nm showed excellent performance with the peak current density of 1.3 mA/ μm . The peak transconductance reaches 0.5 mS/ μm , which is one of the best transconductance for CVD graphene transistor published up to date. Our novel fabrication method shows great potential toward practical implementation of graphene in high frequency devices and circuits.

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