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Wafer scale synthesis of bilayer graphene film¹ KYUNGHOOON LEE, SEUNGHYUN LEE, ZHAOHUI ZHONG, Department of Electrical Engineering and Computer Science, University of Michigan, Ann Arbor, MI 48109, USA — The discovery of electric field induced bandgap opening in bilayer graphene paves the way for making semiconducting graphene without aggressive size scaling, or using expensive substrates. Despite intensive research, synthesizing homogeneous bilayer graphene in large size has proven extremely challenging, and the size of bilayer graphene was limited to micrometer scale by exfoliation Here we demonstrate homogeneous bilayer graphene films over at least square inch area, synthesized by chemical vapor deposition on copper foil and subsequently transferred to arbitrary substrates. Bilayer coverage of over 99% is confirmed by spatially resolved Raman spectroscopy. The result is further supported by electrical transport measurements on bilayer graphene transistors with dual-gate configuration, where field induced bandgap opening is observed in 98% of the devices. The size of our bilayer graphene film is only limited by the synthesis apparatus and can be readily scaled up, thus enabling wafer scale graphene electronics and photonics.

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