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Scalable templated growth of graphene patterns on SiC and their electronic properties MING RUAN, JAMES PALMER, JOHN HANKINSON, YIKE HU, BAIQIAN ZHANG, ZELEI GUO, RUI DONG, ANTON SIDOROV, ZHIGANG JIANG, School of Physics, Georgia Institute of Technology, CLAIRE BERGER, CNRS- Institut Néel, Grenoble, France & School of Physics, Georgia Institute of Technology, WALT DE HEER, School of Physics, Georgia Institute of Technology — Conventional graphene growth research focuses on SiC on-axis surfaces: SiC (0001) and (000-1). In our previous work, we showed that graphene can be selectively grown on off-axis SiC crystal facets, demonstrated the possibility for templated graphene growth. Here we show scalable production of various devices made with this technique, such as graphene nanoribbons, Hall bars and Aharonov–Bohm rings. Graphene and SiC crystal facets are characterized with SEM and SPM tools. Shubnikov-de Haas oscillations and other phase coherent transport phenomena are observed at low temperature. These observations indicate that the structured epitaxial graphene growth can be a viable method for graphene electronics.

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