

Abstract Submitted
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Epitaxial Graphene on SiC for Ultra-high Frequency Transistors¹

ZELEI GUO, RUI DONG, School of Physics, Georgia Institute of Technology, PARTHA SARATHI CHAKRABORTY, NELSON LOURENCO, School of Electrical and Computer Engineering, Georgia Institute of Technology, JAMES PALMER, YIKE HU, MING RUAN, JOHN HANKINSON, JAN KUNC, School of Physics, Georgia Institute of Technology, JOHN CRESSLER, School of Electrical and Computer Engineering, Georgia Institute of Technology, CLAIRE BERGER, WALT DEHEER, School of Physics, Georgia Institute of Technology — Electronic devices and systems operating at ultra-high frequencies have recently generated significant interest. Graphene is considered a promising candidate material for high-frequency electronics, due to its intrinsic low dimensionality, high carrier mobility and large carrier velocity. Field effect transistors made of exfoliated graphene flakes as the channel material have shown cut-off frequency (f_T) above 400 GHz. However, the maximum oscillation frequency (f_{max}) of graphene transistors, which sets the practical limit on useful circuit operation, to date have not exceeded 45 GHz. We report here record intrinsic f_{max} of 70 GHz, with f_T exceeding 100 GHz, for transistors based on epitaxial graphene on SiC. In addition to setting a new performance record for graphene technology, these epitaxial graphene transistors were fabricated using well-developed, robust, top-down processes compatible with a mass-production-compatible platform.

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