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Semiconducting Graphene Ribbons Grown on Nitrogen-Seeded SiC FENG WANG, Georgia Inst of Tech, GANG LIU, Rutgers University, SARA ROTHWELL, University of Minnesota, MEREDITH NEVIUS, MATTHEW CONRAD, Georgia Inst of Tech, PHILIP COHEN, University of Minnesota, LEONARD FELDMAN, Rutgers University, EDWARD CONRAD, Georgia Inst of Tech — A wide band gap semiconducting form of graphene can be produced by growing a buckled form of graphene from a SiC$(000\bar{1})$ surface randomly seeded with nitrogen. In this work, we show that the disorder observed in this form of graphene can be substantially reduced by pre-patterning the nitrogen seeded SiC surface into trenches. The result of the patterning is highly improved film thickness variations, orientational epitaxy, domain size, and electronic structure. In addition, the ordering induced by this patterned growth offers a way to take advantage of the extremely high mobilities and switching speeds in C-face graphene devices while having the thickness uniformity and fabrication scalability normally only achievable for graphene grown on the SiC(0001) Si-face.

Feng Wang
Georgia Inst of Tech

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