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A 1D wide band gap graphene metal-semiconductor-metal junction for devices[1] MEREDITH NEVIUS, JEREMY HICKS, Georgia Institute of Technology, ANTONIO TEJEDA, Synchrotron SOLEIL,Institut Jean Lamour, CNRS - Univ. de Nancy - UPV-Metz, AMINA TALEB-IBRAHIMI, UR1 CNRS/Synchrotron SOLEIL, FENG WANG, EDWARD CONRAD, Georgia Institute of Technology — Despite many advances in understanding graphene physics, progress towards a working, reproducible graphene-based switch has been nearly stagnant. Mastering obstacles like lithographic limitations, process-induced disorder, scalability, and reproducibility is absolutely crucial. We have successfully grown graphene over patterned steps on silicon carbide and, using angle resolved photoemission spectroscopy, have discovered a one-dimensional metal-semiconducting-metal junction made completely from graphene. The junction is created by inherent graphene-substrate interactions as the graphene grows over the patterned steps. The semiconducting graphene strip is connected on either side by metallic graphene sheets and has a band gap of greater than 0.5 eV.[REF] In addition, experimental results show that the average electronic band structure of thousands of ribbons varies very little even on length scales of tens of microns. We will present results on the growth of these graphene structures along with angle resolved photoemission spectroscopy measurements that reveal the band structure of both the graphene ribbons on the step facets and the 1D semiconducting strip. REF Nature to be published

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