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Lattice-Nanotomy for Large-Scale Production of Transferrable and Dispersible Graphene-Nanostructures of Controlled Shape and Size¹ BALABALAJI PADAVALA, NIHAR MOHANTY, Kansas State University, DAVID MOORE, University of Kansas, ZHIPING XU, Tsinghua University, ASHVIN NA-GARAJA, ALFREDO A. RODRIGUEZ, VIKAS BERRY, Kansas State University, DR. MOORE'S TEAM TEAM, DR. XU'S TEAM TEAM — In this talk, we will present a novel graphite-lattice-nanotomy (nanoscale-cutting) process for high throughput production of monodispersed graphene nanostructures (GNs) with controlled shape (square, rectangle, ribbons and triangle), dimensions (sizes at 5 nm resolution with a range of 5–600 nm) and chemical-construct. We demonstrate that this versatile process enables the realization of unprecedented graphene-nanostructures, which exhibit the evolution of semiconductor-characteristics and electrical transport mechanism. Further, we will present in detail the size and shape-dependent electrical and optical properties of these GNs via various microscopic and spectroscopic techniques. This nanotomy process can provide access to virtually-infinite and unprecedented GNs for development of fundamental optical/electrical/structural correlations and novel applications.

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