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Electrical Transport Study of Suspended Graphene Nanoribbons MING-WEI LIN, KULWINDER DHINDSA, LEZHANG LIU, QING LAN, Department of Physics and Astronomy, Wayne State University, MARK MING-CHENG CHENG, Wayne State University, LUIS AGAPITO, NICHOLAS KIOUSSIS, California State University, ZHIXIAN ZHOU, Department of Physics and Astronomy, Wayne State University — Suspended graphene nanoribbon field effect transistors from unzipped multiwall carbon nanotubes have been fabricated. Electrical transport measurements show that current-annealing effectively removes the adsorbed impurities on the suspended graphene nanoribbons. Further increasing the annealing current creates a narrow constriction in the ribbons with non-negligible disorder, leading to the formation of a large band-gap and subsequent high on/off ratio. On the other hand, uniform suspended graphene nanoribbons with ultra-low-disorder reveal a high mobility exceeding 3000 cm2 V-1 s-1 and an intrinsic band gap. The width and length dependence of the electrical transport properties of ultra-low-disorder graphene nanoribbons with nearly atomically smooth edges will also be discussed.

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