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## Development of field effect transistor based on single graphene ribbon prepared by a modified unzipping process of MWCNT

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### Abstract

Here we report the synthesis of graphene ribbon by unzipping the carbon nanotubes and investigate its performance as a field effect transistor. The produced graphene ribbons were characterized by transmission electron microscopy (TEM), Raman spectroscopy, X-ray photoelectron microscopy (XPS) and atomic force microscopy (AFM). A single layer graphene ribbon with average width of 600 +/- 20 nm was obtained. This ribbon was drop casted on a silicon substrate coated by 300 nm silicon oxide layer with patterned gold electrode by lithography system. The developed single graphene FET showed very high saturation current density of 2.8A/mm, electrons mobility of 4000 cm<sup>2</sup>/V.s and holes mobility of 3200 cm<sup>2</sup>/V.s. These values are higher than the values obtained from FET based graphene prepared by CVD and chemical exfoliation methods. The enhancement of the saturation current value and obtaining high mobility for FET based on single graphene ribbon will open a new avenue to develop a new generation of FET for future applications. (C) 2016 Elsevier B.V. All rights reserved.

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