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Accession number:20112714115358

Title:Mobility improvement and microwave characterization of a graphene field effect transistor with silicon nitride gate dielectrics

Authors: Habibpour, Omid (1); Cherednichenko, Sergey (1); Vukusic, Josip (1); Stake, Jan (1)

Author affiliation:(1) the Terahertz and Millimetre Wave Laboratory, Department of Microtechnology and Nanoscience, Chalmers University of Technology,SE-412 96 Göteborg, Sweden

Corresponding author: Habibpour, O.(omid.habibpour@chalmers.se)

Source title:IEEE Electron Device Letters

Abbreviated source title:IEEE Electron Device Lett

Volume:32

Issue:7

Issue date:July 2011

Publication year:2011

Pages:871-873

Article number:5770174

Language:English

ISSN:07413106

CODEN:EDLEDZ

Document type: Journal article (JA)

Publisher:Institute of Electrical and Electronics Engineers Inc., 445 Hoes Lane / P.O. Box 1331, Piscataway, NJ 08855-1331, United States

Abstract: We report on the influence of a silicon nitride gate dielectric in graphene-based field-effect transistors (FETs). The silicon nitride is formed by a plasma-enhanced chemical vapor deposition method. The process is based on a low-density plasma at a high pressure (1 torr), which results in a low degradation of the graphene lattice during the top-gate formation process. Microwave measurements of the graphene FET show a cutoff frequency of 8.8 GHz for a gate length of 1.3 μ m. A carrier mobility of 3800 cm2/V \cdot s at room temperature was extracted from the dc characteristic.