



Sonderseminar

Freitag, 26. Januar 2018
12:00 Uhr

ZNN, Seminarraum EG 0.001

“Reliability of hexagonal boron nitride dielectric stacks for CMOS applications”

Hexagonal boron nitride (*h*-BN) is a two-dimensional (2D) layered insulator (direct band gap ~ 5.9 eV) with superb mechanical strength (500 N/m), large thermal conductivity ($600 \text{ Wm}^{-1}\text{K}^{-1}$), and high chemical stability (up to 1500 °C in air), and for these reasons this material has attracted much attention for a wide range of potential applications. For example, thanks to their ultra-flat surface free of dangling bonds *h*-BN substrates can increase the mobility of graphene-based FETs up to $\sim 140,000 \text{ cm}^2\text{V}^{-1}\text{s}^{-1}$ (on SiO_2 substrates it is lower, $15,000 \text{ cm}^2\text{V}^{-1}\text{s}^{-1}$). However, despite its enormous potential, the use of *h*-BN as dielectric in electronic devices is less widespread. In this seminar I will present a combined nanoscale and device-level reliability study that describes the entire dielectric breakdown (BD) process of large area *h*-BN dielectric stacks grown via chemical vapor deposition, as well as its potential use in resistive random access memories.

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