

SEMINAIRE *

Vendredi 7 septembre 2007 à 11h00

Bâtiment 466, salle 111 - CEA Saclay, 91191, Gif sur Yvette

Surface-new-material: Epitaxial silicon oxynitride layer on a 6H-SiC(0001) Surface

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Invité par P. SOUKIASSIAN

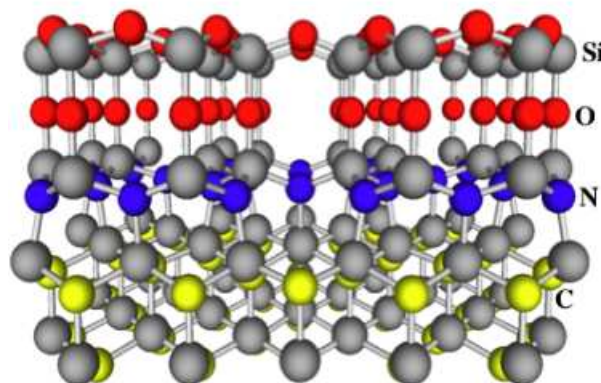
Résumé:

We found that hydrogen-gas etching of a 6H-SiC(0001) surface and subsequent annealing in nitrogen atmosphere lead to the formation of a silicon oxynitride (SiON) epitaxial layer with the order of root 3 x root 3. A quantitative low-energy electron diffraction (LEED) analysis revealed that it has a hetero double-layer structure: a silicate monolayer on a silicon nitride monolayer via Si-O-Si bridge bonds. Empty- and filled state images of scanning tunneling microscopy (STM) confirm the optimized structure model [1]. There is no dangling in the unit cell, which explains a fact that the structure is robust against air exposure. Scanning tunneling spectroscopy (STS) measured on the SiON layer shows a bulk SiO₂ like band gap of ~9 eV.

Angle-resolved photoemission spectroscopy (ARPES) using synchrotron radiation has been applied to the SiON film at PF-KEK. Almost flat band was found at the binding energy of ~4 eV, which can be assigned to O 2p non-bonding states, supporting the above assignment of the filled-state image. Another flat band was observed at ~2 eV, which was assigned to N 2p non-bonding states. Core level shift (CLS) of Si 2p has also been measured for the SiON film, and separated into three components. Results of electronic structures obtained by STM, STS, ARPES and CLS are consistent with the SiON structure determined by LEED.

[1] T. Shirasawa, K. Hayashi, S. Mizuno, S. Tanaka, K. Nakatsuji, F. Komori and H. Tochiara: Phys. Rev. Lett. **98**, 136105 (2007).

Ball-and-stick model of a silicon oxynitride layer epitaxially grown on 6H-SiC(0001)
Phys. Rev. Lett. 98, 136105 (2007)



*** SERA PRECEDE D'UNE PAUSE-CAFE A PARTIR DE 10H30**