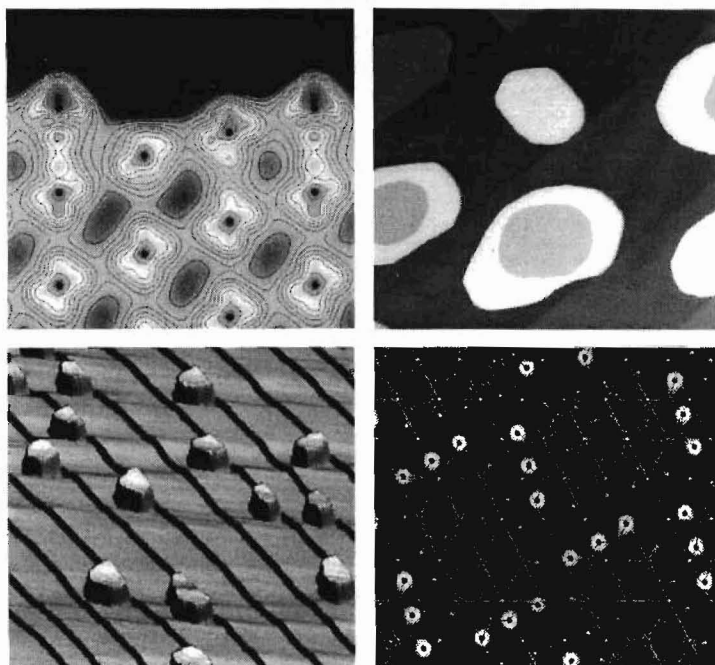


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DEFECTS OF SiC NANOWIRES STUDIED BY STM AND STS

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Silicon carbide nanowires (SiCNWs) belong to the 1-D nanostructures family. These materials are very promising for nanotechnology applications [1]. The ideal SiCNWs are generally thin elongated SiC nanocrystals. However, like other 1-D nanostructures (e. g. carbon nanotubes) SiCNWs also possess various structural defects that can be divided into two classes: (i) 'large-scale' deformations (e.g. kinks, twists) and (ii) 'atomic-scale' defects (e.g. dislocations, vacancies). These two families of defects are in close relationship and furthermore, the local electronic structure of SiCNWs is expected to be perturbed in the vicinity of such defects.

In the present paper, the investigations of large-scale deformations of SiCNWs and their influence on the surface electronic structure were carried out. The scanning tunneling microscopy (STM) and spectroscopy (STS) were employed to determine the complex structures in SiCNWs produced via combustion synthesis route [2] and to detect the fluctuations of the local density of electronic states (LDOS) accompanying deformations. The local graphitization and the inhomogeneous concentration of doping impurities (e.g. nitrogen) were considered to explain LDOS fluctuations in the vicinity of SiCNWs deformations. Thus, new information for the understanding of surface electronic properties of 1-D nanostructures based on SiC compound have been achieved.

[1] W.M. Zhou, F. Fang, Z.Y. Hou, L.J. Yan, Y.F. Zhang, *IEEE El. Dev. Lett.* 27 (2006) 463.

[2] S. Cudziło, M. Bystrzejewski, H. Lange, A. Huczko, *Carbon* 43 (2005) 1778.