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１．概要（Summary ）：Vicinal surfaces, consisting of array of terraces and facets, provide unique periodic template for selective growth of nanostructures such as graphene nanoribbons (GNRs). The edge quality of nanoribbon plays crucial role in their properties. This time we studied the Si cleaning technique to prepare vicinal nanosurface with well-defined straight step edges. Also the intercalation of additional Si into graphene/SiC interface has been studied. The analysis required for this research has to include knowledge of the processes locally occurred on the surface, for which scanning tunneling microscopy (STM) is an indispensable technique.

２．実験（Experimental）：To achieve our goals we used commercial variable temperature (VT) STM machine by Omicron NanoTechnology GmbH installed in laboratory of Prof. M. Yoshimura. The SiC(0001) were introduced in the vacuum chamber and cleaned by resistive heating in a Si flux. STM images have been taken in constant current mode using chemically etched tungsten tips.

３．結果と考察（Results and Discussion）：The electronic properties of GNRs grown on terraces of vicinal SiC surface suffer from unreliability of the edge structure. The quality of the edge on the other hand depends strongly on the quality and perfectness of the step edges of underlying SiC nanosurface. We have developed cleaning procedure of substrate annealing in Si flux to prepare well defined and extremely straight terrace step edges. STM study showed that one-dimensional Si-adatom chains may be formed along the facet step edges. These chains give rise to very well defined streaks observed in low-energy electron diffraction (LEED) patterns, which can serve as an indicator for nanosurface step edge quality in the case of lacking STM equipment for local imaging. The formation of atomic chains and edge reconstructions were not studied before and therefore present certain scientific interest as well.

Another interesting topic is Si intercalation into graphene/SiC interface. Our experiments show that Si deposition on heated graphitized SiC surface results in Si atoms intercalation in the confined space between graphene layer and SiC substrate, producing new unreported earlier structures. As a speculation based on the initial experiments, one may expect silicene-like (silicene – graphene-like structure made of Si atoms) two-dimensional layer formation at the grephene/SiC interface.

４．その他・特記事項（Others）
None

５．論文・学会発表
（Publication/Presentation）：
日本物理学会 第 69 回年次大会 東海大学 （３月２７日～３０日）: 1. A.Visikovskiy, S. Kimoto, T.Kajiwara, S.Tanaka, M.Yoshimura "Silicon layer at

graphene/SiC(0001) interface, structural and electronic properties by calculation and scanning tunneling microscopy"

2. 林真吾, A. Visikovskiy, 梶原隆司, 吉村雅満, 田中悟"SiC(0001)ステップエッジにおける 1 次元 Si 原子配列"

6．関連特許（Patent）

None