Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Local distribution of segregated Si on the hydrogen-treated Ge/Si(001) studied by STM YASUNORI FUJIKAWA, ATSUSHI KUWANO, YUKIKO YAMADA-TAKAMURA, TADAAKI NAGAO, TOSHIO SAKURAI, Institute for Materials Research, Tohoku University — Intermixing effect between Si and Ge is the key issue to achieve precise composition control of the SiGe nanodevices. It has been known that hydrogen-rich condition at ∼300 C induces segregation of Si to the surface layer of the Ge covered Si(001) surface, while Ge prefers to stay at the surface layer without hydrogen[1]. The local distribution of Si and Ge on the Ge/Si(001) surface was investigated by STM to study the atomic process of this intermixing effect. We found that Si-H and Ge-H sites on the H-terminated Ge/Si(001) can be resolved using the empty-state imaging condition, which is similar to the recently-reported case of Cl-terminated Ge/Si(001)[2]. Furthermore, it was found that the segregation of Si induced by the H-annealing produces significantly bright features beside the dimer-row vacancies (DVLs) in the empty state image of H-Ge/Si(001), in addition to the features coming from normal Ge-H and Si-H sites. The statistic analysis of these features revealed that the segregated Si atoms are mostly located at the brightest feature beside the DVLs, supporting the previously suggested model of intermixing process[1]. [1] Rudkevich *et al.*, Phys. Rev. Lett. **81**, 3467 (1998). [2] Lin *et al.*, Phys. Rev. Lett. **90**, 046102 (2003).

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Date submitted: 01 Dec 2004 Electronic form version 1.4