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Evolution of Si nanostructures on the Ge(001) surface YASUNORI FUJIKAWA, TOSHIO SAKURAI, Institute for Materials Research, Tohoku University — Growth of compressively strained thin films has been studied extensively for the applications in quantum devices composed of 2D quantum well and/or 1D quantum dots. Recent progress in the strain-controlled Si and SiGe high-speed devices brings increasing interest in the growth control of the oppositely strained thin films and nanostructures. In this work, we report on the morphology evolution of the Si layer formed on the Ge(001) substrate to investigate the effect of tensile strain in the growth of Si. Initially the Si layer forms a wetting layer characterized by the formation of missing dimer rows with spacing of 3-4 rows. The direction of the defect row is 90-degree rotated from the case of the Ge wetting layer on Si(001), being explained by the anisotropic strain of the dimer-row structure. Successive growth of Si results in the formation of Si islands, whose surface is composed of four {113} facets with a small (001) terrace on top. Its differences from the Ge dome structure on Si(001) composed of {113} facets and {105} facets on top can be understood by considering the tensile strain of the {105} facets [1]. [1] Y. Fujikawa *et al.*, Phys. Rev. Lett. **88**, 176101 (2002).

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