

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Strain-promoted growth of Mn silicide nanowires on Si(001)¹

KAZUSHI MIKI, HONGJUN LIU, National Institute for Materials Science, 1-1 Namiki, Tsukuba, Ibaraki 305-0044, Japan., JAMES H.G. OWEN, CHRISTOPH RENNER, Université de Genève, Section de Physique/DPMC, Quai Ernest-Ansermet 24, 1211 Genève 4 — We have discovered a method to promote the growth of Mn silicide nanowires on the Si(001) at 450°C. Deposition of sub-monolayer quantities of Mn onto a Si(001) surface with a high density of Bi nanolines results in the formation of nanowires, 5-10 nm wide, and up to 600 nm long. These nanowires are never formed if the same growth procedure is followed in the absence of the Bi nanolines. The Haiku core of the Bi nanoline is known to induce short-range stress in the surrounding silicon surface, straining neighbouring dimers, and repelling step edges [1]. We discuss the possible mechanisms for this effect, including the effect of the Bi nanolines on the surface stress tensor and alteration of the available diffusion channels on the surface.

[1] J. H. G. Owen, K. Miki, and D. R. Bowler *J. Mat. Sci.* 41 4568-4603 (2006)

¹This research was partially supported by the Ministry of Education, Science, Sports and Culture, Grant-in-Aid for Scientific Research, the Iketani Science and Technology Foundation.

Kazushi Miki
National Institute for Materials Science

Date submitted: 24 Nov 2010

Electronic form version 1.4