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Low temperature Silicon epitaxy on bare Si (100) and H terminated Si (100) surfaces XIAO DENG, PRADEEP NAMBOODIRI, KAI LI, NIST - Natl Inst of Stds Tech, XIQIAO WANG, University of Maryland, College Park, TONGBAO LI, Tongji University, Shanghai, China, RICHARD SILVER, NIST - Natl Inst of Stds Tech — Silicon on Silicon growth morphology is studied using an ultrahigh vacuum scanning tunneling microscopy (UHV-STM) and transmission electron microscopy (TEM). Sub-monolayer to 18 nm of silicon was evaporated using an all-silicon sublimation source (SUSI) onto a UHV prepared Si (100) sample at 250C. The results are compared with the growth characteristics on hydrogen passivated surfaces (H: Si) under identical experimental conditions. STM images indicate that growth morphology of both Si on Si and Si on H: Si is of epitaxial nature at temperatures as low as 250C. For Si on bare Si growth at 250C, there exists a stable thickness regime where Si epitaxial growth front keeps the same morphology. Although the mobility of silicon is modestly affected on the H: Si surface because of the H atoms during the initial sub-monolayer regime, the growth proceeds epitaxially with the 3D island growth mode and noticeable surface roughening.

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