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Growth of Pb nanowires on the Si(111)-In (4x1) a combined STM and SPALEED study[1] MYRON HUPALO, MICHAEL YAKES, MICHAEL TRINGIDES, Ames Laboratory-Iowa State University — Due to the combined effect of QSE and the anisotropic strain potential of the substrate, Pb deposited on Si(111)–In (4x1) at 180K grows in nanowires of uniform 4-layer height and controllable uniform width of $5w_0$ (where w_0=1.33nm is the width of the reconstruction unit cell along [1_1_2] direction). SPA-LEED studies confirm this selected 4-layer height (from Intensity vs K_z variation) which is unusually stable because it is unchanged even after annealing to room temperature. The same selected 4-layer height is observed on a different interface Si(111)-In $\sqrt{31}$x$\sqrt{31}$ which independently confirms the unusual 4-layer stability. Differences in the observed corrugation on the tops of the nanowires due to the Moiré pattern at the metal/semiconductor interface confirm the strain anisotropy on the reconstructed substrate. Further Pb deposition on top of the nanowires results in the completion of the Pb layer with unusually atomically flat film interfaces over mesoscopic distances.

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