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Step bunching kinetics of vicinal silicon (111) surface : A method for nanopatterning DO YOUNG NOH, MYUNG-HUN CHO, TAE CHUL KIM, Gwangju Institute of Science and Technology, JINWOOK CHUNG, Pohang University of Science and Technology — A vicinal Si(111) surface shows a uniform atomic step array above the 7x7 reconstruction temperature. Below the reconstruction temperature, the surface phase separate into step-bunched regions and large (111) terraces. In this experiment, the evolution of the surface morphology during the step bunching is studied using *in-situ* real time x-ray scattering measurement. The period of the nano-scale 'step-bunched and terrace' structure at various quench temperatures below the 7x7 transition is obtained as a function of time by grazing incident small angle scattering measurement. The evolution of the surface roughness, measured by x-ray reflectivity, shows that the bunching occurs in two distinct steps. The nano-scale patterns are also examined by *ex-situ* atomic force microscopy. We shall also discuss how to control the size of the step-bunched regions and the separation between them by adjusting kinetic parameters such as the step-bunching temperature and the bunching time.

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