

Surface reconstruction induced step bunching kinetics on vicinal Si(111) surface: x-ray scattering study

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The vicinal Si(111) surface shows the self-assembled surface structure resulted from the step bunching after the surface is quenched below (1x1)-to-(7x7) phase transition temperature. We investigated the step bunching kinetics by in-situ synchrotron x-ray scattering measurements. The scaling concept was applied to understand the step bunching behavior. The time dependence of the lateral period of the step bunched structure shows three distinctive stages; the spinodal-decomposed initial step bunching, coarsening of the structure, and the saturation of the period. Also, The time dependence of the period at all measured annealing temperatures follows a universal curve.