Abstract Submitted
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Growth instabilities and adsorbed impurities: Nanostructuring of vicinal surfaces controlled by adsorbates[1] AJMI BHADJ HAMOUDA, T.L. EINSTEIN, U. of Maryland, College Park, P.E. HOGGAN, A. PIMPINELLI, LASMEA, U. Blaise-Pascal, Clermont-2 — A kinetic Monte Carlo study of the meandering instability of a vicinal surface growing by step flow is performed. Impurities are co-deposited during growth, and they are shown to be responsible for quantitative and qualitative modifications of the surface morphology. In particular, impurities make adatom diffusion less dependent on the deposition rate, affecting thus the wavelength of the meandering. Impurities also act as nucleation centres, causing small stepped pyramids to appear on the surface. Comparison with step- flow experiments on vicinal Cu(100) make plausible the hypothesis that many previously unexplained features of the meandering instability in this system are due to impurities. The density of nano-pyramids can be tuned by varying the impurity concentration. Our results show also that the step bunching instability is strongly affected by adsorbated impurities having lower diffusion rate than adatoms. Such impurities slow the adatoms diffusion and weakens the instability, even removing it at large impurities concentration.

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