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Morphological Evolution of the low energy Ar^+ sputtered Pd(001)

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We study the morphological evolution of Ar^+ sputtered Pd(001) at normal incidence. Palladium is selected for possible catalytic application of sputtered Pd surface, because sputtering produces high population of defect sites that are chemically very active. By employing *in-situ*, real time x-ray reflectivity (XRR) and *in-situ* scanning tunneling microscopy (STM) studies, we find that the sputtered Pd(001) is predominantly formed of adatom islands that order as sputtering time increases. Sputtered surface shows kinetic roughening and coarsening with kinetic roughness exponent, β, from 0.20(± 0.02) to 0.25(± 0.02) with increasing Ar^+ ion energy from 0.5 to 2 KeV, and coarsening exponent, n, 0.20 for Ar^+ ion energy, 0.5 KeV. Both observed critical exponents are lower than those predicted by all the known continuum models including the Kuramoto-Sivashinsky (KS) model. We attribute the observed low critical exponents to the diffusion bias effect or the slow diffusion across low coordinated sites such as step edge and kink sites.