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Sputter Erosion of Ni(111) studied using Low Energy Electron Microscopy MAHESH RAJAPPAN, MICHAL ONDREJCEK, WACEK SWIECH, C. PETER FLYNN, Department of Physics and Materials Research Laboratory, University of Illinois at Urbana-Champaign — Sputter erosion of Ni (111) by 1 keV Ar^+ions in the temperature range between 400 and 750K has been investigated using low energy electron microscopy (LEEM). Characteristic step profiles are found as a function of sputtering temperatures and durations. Below 500K sputtering leads to ragged steps and small islands. As the sputtering temperature is increased a regular sequence of the surface morphology changes with the sputtering temperatures. Sine-like waves occur at intermediate temperatures , which evolve into sharp peaked ripples resembling interfacial structures reported for the Mullins-Sekerka instability of driven solidification interfaces. This behavior is very similar to our earlier observations on Pd (111) and Pt (111). At high sputtering temperatures, the steps become smoother with only weak periodic structure. Distinctly, erosion of Ni (111) gives rise to spiral structures at screw dislocations exhibiting well-defined crystallographic features. At longer sputtering times with $\sim$ 120 ML removed, the star-like structures form. This research is supported by DOE grants DEFG02-02ER46011 and DEFG02-91-ER45439 through the Center for Microanalysis of Materials, University of Illinois.

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