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Effects of Sputtering Energy on Surface Defect Formation on Ge(110)[1] SAMANTHA MACINTYRE[2], MARSHALL VAN ZIJLL, BRET STENGER, MICHAEL NORTON, NOELLE OGURI, SHIRLEY CHIANG, University of California Davis — Pyramid-shaped defects were observed in STM images to form on clean Ge(110) surfaces as a result of argon ion sputtering. By periodically imaging the samples after various numbers of sputtering and annealing cycles, we systematically studied the formation of these defects as a function of the Ar^+ ion sputtering energy. Although the number and size of pyramids increased with sputtering energy from 100 to 200eV, the sample sputtered with 300eV ions showed a very flat surface with very few pyramids. The sample sputtered with 400eV ions appears to have mountain ranges of highly stepped regions with numerous pyramids on the edges, separated by flat valleys of reconstructed c(8x10) surface. Many pyramids are capped by a cluster of atoms, probably carbon, which may have served as the nucleation site. To explain the dependence of defect formation on sputtering energy, we present a mechanism involving competition between uncovering parts of new pyramids and breaking down older pyramids. Using different sputtering energies for controlled defect formation could be an effective tool for controlling island growth at defects on substrates.

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