

Abstract Submitted
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Directed Self Assembly and Self-Limiting Growth (SLG) of Mound Formation on Patterned GaAs(001) Surface During MBE Homoepitaxy¹ CHUAN-FU LIN, University of Maryland, HUNG-CHIH KAN, National Chung-Cheng University, Taiwan, SUBRAMANIAM KANAKARAJU, CHRIS RICHARDSON, Laboratory for Physical Sciences, RAY PHANEUF, University of Maryland — We present the results of molecular beam epitaxial growth experiments on nanopit-patterned GaAs(001) surfaces at temperatures near 500°C. We find that in the initial stage of growth, the pattern directs the spontaneous formation of multilayer islands at 2-fold bridge sites between neighboring nanopits along [110], seemingly due to the presence of an Ehrlich-Schwoebel barrier [1]. However, as growth continues, the height of mounds at 2-fold bridge “self-limits”: the mounds cease to grow. Beyond this point an initially less favored 4-fold bridge site for mounds dominates and a different pattern of self assembled mounds begins. We propose that a minimum, “critical terrace size” at the top of each mound is responsible for the observed self-limiting growth.

[1] T. Tadayyon-Eslami, H.C. Kan, L.C. Calhoun & R.J. Phaneuf, *Phys. Rev. Lett.* **97**, 126101 (2006)

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