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Island Dynamics Model for Mound Formation: Effect of a Step-Edge Barrier CHRISTIAN RATSCH, UCLA, DIONISIOS MARGETIS, University of Maryland, FREDERIC GIBOU, UCSB — We have developed an island dynamics model for epitaxial growth with the level-set technique, where islands are treated as continuous in the x-y-plane, while individual atomic layers are resolved in the z-direction. Adatoms are treated as a mean field quantity by solving a diffusion equation. We will discuss an analytic derivation for the proper expression for the equilibrium adatom density at the step edge in the presence of a step-edge barrier. The effect of an additional step-edge barrier is incorporated via a mixed Robin-type boundary condition for the diffusion equation. We will present a numerical scheme to solve such a boundary condition on a fixed grid with moving boundaries. We will show how the inclusion of the step-edge barrier leads to the formation of mounds that become progressively steeper as the step-edge barrier increases. Finally, we will discuss how we can include the effect of downward funneling in our model, and how it leads to the stabilization of the slope of the mounds.

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