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Simulation of Step-Biased Evolution Cobalt Silicide islands on (5x2) reconstructed Au/Si(111) surfaces[1] HUNG-CHIH KAN, TI-LI LIN, AN-LI CHIN, FU-KWO MEN, Department of Physics, National Chung Cheng University, Chia-Yi, Taiwan, ROC — We report our simulation for the evolution of Cobalt Silicide islands on (5x2) reconstructed Au/Si(111) surfaces during annealing process in an ultra-high vacuum (UHV) environment. Our observation based on scanning electron microscopy shows that all the Co atoms deposited on the surface at room temperature form cobalt silicide islands on the terraces and across the steps at the beginning of the annealing. Subsequent annealing causes the islands to evolve: Islands grow in size while their number density decreases. The terrace islands eventually disappeared, only the step island survived. The ripening process clearly favors the islands cross the steps. We developed a model based on mean field theory that includes the energetic effects of the interfaces of the island and that of the steps buried under the island to simulate the competition between these two types of islands. Our numerical simulation based on this model reproduces the experiment qualitatively.

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