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Kinetic Monte Carlo Simulation Studies of Nanocolumn Formation in Two-Component Epitaxial Growth[1] SHU ZHENG, University of Tennessee & Oak Ridge National Laboratory & Dalian University of Technology, China, WENGUANG ZHU, University of Tennessee & Oak Ridge National Laboratory, G. MALCOLM STOCKS, ZHENYU ZHANG, Oak Ridge National Laboratory & University of Tennessee — Recent experimental studies have revealed that well-ordered one-dimensional column structures are formed via self-assembly during two-component epitaxial growth of a variety of materials, including diluted magnetic semiconductors and high-Tc superconductors. Here we use kinetic Monte Carlo simulations to study the morphological evolution of a two-component epitaxial system, based on a (1+1)-dimensional lattice model. We find that in systems where the atom-atom interactions obey the relationship of $E_{AB} < (E_{AA}+E_{BB})/2$, ordered nanoscale columns can be formed during the growth. The dependence of the ordering on the growth temperature and deposition rate and on the relative concentration of the two components is also explored.

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