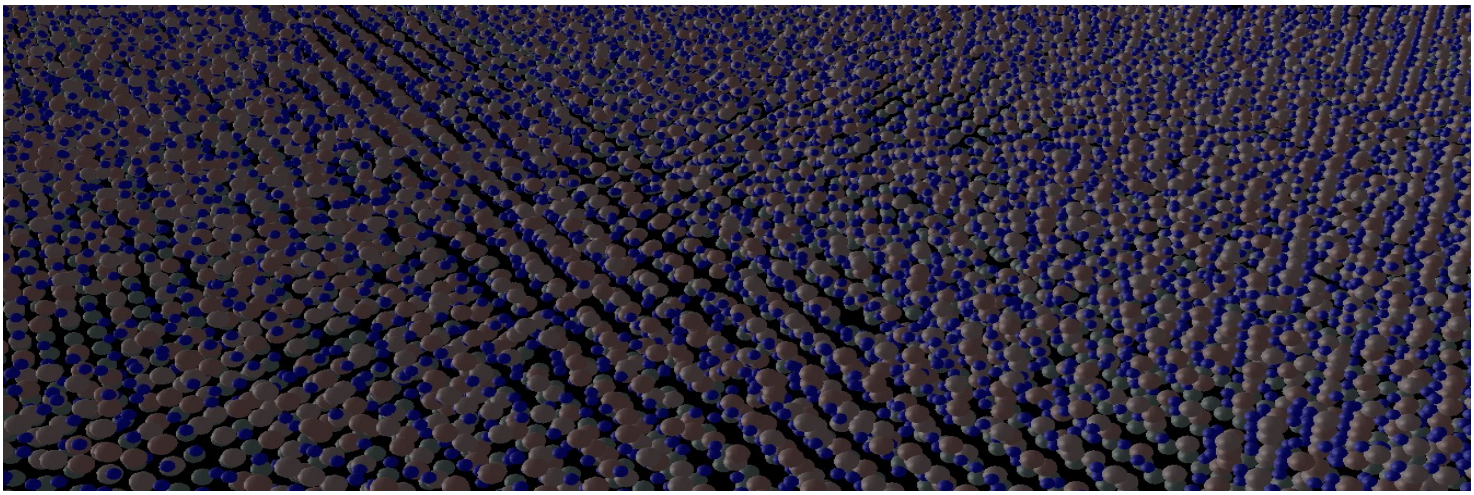
World's First Commercial Innovative
Atomistic Thin Film Growth – EpiGrow Simulator

EpiGrow is an atomistic thin film growth simulator for sp^3 semiconductors with Zincblende or Wurtzite phases



Introduction

Growth of semiconductor thin films on various substrates is a sophisticated, expensive and time taking process. Especially for the growth of costly and rare materials, too much hit and trials can't be tolerated. EpiGrow simulator provides an exact solution for these issues. The EpiGrow simulator simulates the process of thin film growth in the best possible manner. Input conditions for EpiGrow simulator require the real reactor conditions such partial pressures of elements of which thin film has to be grown, substrate temperature and information about substrate etc. Bydefault simulator has physical properties and other relevant properties stored in its database, users may define own input values to overwrite the default values based on their reactor input conditions. The simulator adopts a well-developed Kinetic Monte Carlo technique for the growth of thin films. The ultimate goal of simulation is an accurate extraction of the values of physical parameters which can be extracted easily with sophisticated instruments, such as strain, deformation; roughness of films etc. New models can be added for each generation of devices to match new accuracy demands for future thin film growth technologies.

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Features

- Modeling of Epi-growth process based on MOCVD/MBE/MOVPE Reactors
- Extremely accurate and fast Kinetic Monte Carlo technique
- No Statistical/thermodynamically assumptions
- Based on Adsorption, Diffusion, Desorption rates calculated on the basis of impinging atom and substrate energies
- Growth process, involves four stages: Impact, Physisorption, Chemisorptions, Incorporation
- Sticking coefficient dictate the flux of atoms on the substrate
- Several possible surface morphologies can occur during a given deposition, based upon the growth parameters
- Includes three distinct growth regimes for thin film growth
  - Frank-van der Merwe (FM)
  - Volmer-Weber (VW)
  - Stranski-Krastanov (SK) growth processes.
- Surface diffusion depends on step-edge barriers from both descending steps (Schwoebel barrier) and ascending steps (incorporation barrier)

Benefits can be realized

- Users growth conditions
- Surface & interface profiling (Extracting Roughness)
- Defects Extraction (point defects)
- Extraction of Stress/Strain
- Fewer experiments for optimization
- Reduction in waste during experimentation
- Ability to deal with different reactive species and reactor geometries
- On-line growth process control
- Cost effective solution for thin film growth technology

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