FabLitho

Advanced Lithography Modeling and Simulation Tool

PRIMARIUS

Introduction

FabLitho is a leading lithography modeling and simulation tool in China, designed to build litho models incorporating lens aberrations for various projection systems. It employs high-degree-of-freedom modeling techniques to simulate photoresist behaviors under different process conditions. The tool is optimized for advanced technology nodes and serves diverse applications, including semiconductor manufacturing, flat-panel display production, and advanced chip packaging. It has been successfully validated by several top-tier Foundries.
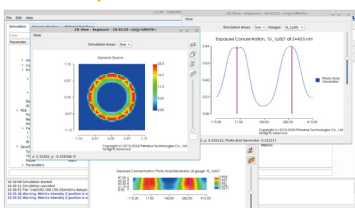
FabLitho utilizes rigorous simulation methodologies to determine process windows across various parameter settings, significantly reducing wafer exposures and manual measurements, thereby enhancing process development efficiency. Additionally, it seamlessly integrates with other process simulation tools, enabling critical pattern process optimization for mask designs and mitigating the risk of pattern failure in production.
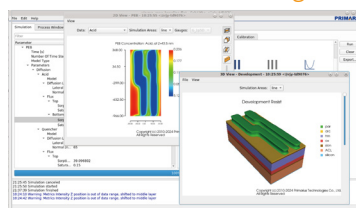

Key Advantages

- **Industry-Standard Optical Modeling**
  Supports mask 3D effects and freeform source modeling

- **Advanced Scanner Modeling**
  Supports arbitrary magnification, oblique incidence, lens Zernike aberrations, and Jones Pupil

- **Comprehensive Empirical Modeling**
  Supports industry-standard Dill model, PEB diffusion and reaction effects, development effects, and shrinkage modeling

- **Diverse Exposure Processes**
  Capable of handling single exposure, multiple exposure (LLE), and multi-focal lithography

- **Resist Model Building and Optimization**
  - Build-in parameter optimization engine
  - Capable of fitting resist model parameters based on wafer data

- **Rich GUI Design**
  Intuitive GUI designs for internal and external data visualization

- **Extensible Development API**
  - Built-in C and Python API
  - JSON and CSV data exchange

- **Versatile Data Export Formats**
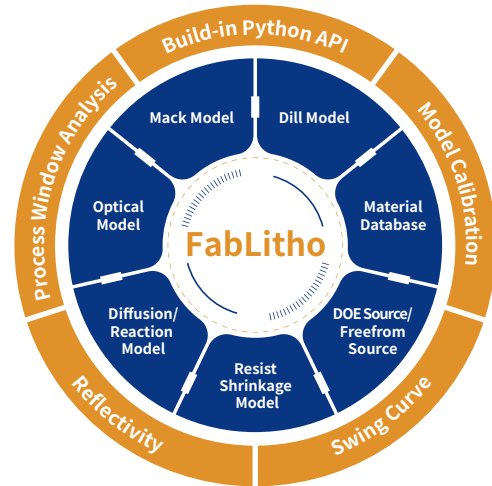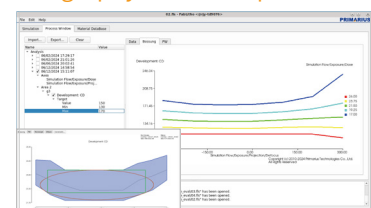 Supports export to TXT, GDSII, and STL formats

Specifications

- **Build-in Material Database**
  Refractive index (n), absorption coefficient (k) across different wavelengths, and Dill parameters

- **Standard Lithography Wavelengths**
  365 nm, 248 nm, and 193 nm with options for custom wavelengths and laser peak widths

- **External or Custom Light Source Input**
  Conventional, annular, multipole, multi-annular, and freeform sources with different polarization options

- **Modeling of Common Photoresists**
  DNQ and CAR photoresists with positive and negative development tone

- **Diverse Simulation Data Visualization Methods**
  2D/3D substrate, 2D Intensity, concentration, resist profile, 3D resist profile, Pupil Filling, Bossung Curve, Swing Curve

- **Outputs**
  ILS, NILS, contrast, reflectivity, CD, PR thickness, PR side wall angle

Applications

- Lithography Window Simulation and Parameter Optimization
- Simulation and Optimization of Critical Patterns
- Assistance in OPC model Parameter Development
- Photoresist Parameter Evaluation and Optimization
- Parameter Evaluation and Optimization of Lithography Equipment

Application Examples

Optical Simulation

Photoresist Modeling

Lithography Window Optimization