

CHE 323, Chemical Processes for Micro- and Nanofabrication

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WHAT STARTS HERE CHANGES THE WORLD

CHE323/CHE384
Chemical Processes for Micro- and Nanofabrication
www.lithoguru.com/scientist/CHE323

Review Questions by Lecture (61-69)

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Lecture 61: Electron Beam Lithography, part 1

- How can electrons be used to form an image?
- Name two common ways to generate electrons for an e-beam lithography system?
- What are the main writing strategies?
- Explain the resolution-throughput trade-off

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Lecture 62: Electron Beam Lithography, part 2

- How does scattering change with electron energy?
- How can we predict electron scattering?
- What gives rise to e-beam lithography proximity effects?
- What are the main advantages of e-beam lithography?
- What are the main disadvantages of e-beam lithography?

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Lecture 63: Nanoimprint Lithography, part 1

- What is "soft lithography"?
- Name three types of nanoimprint lithography
- What are the advantages of imprint lithography?
- What are the main advantages of Step-and-Flash imprint over thermal imprint?

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Lecture 64: Nanoimprint Lithography, part 2

- What are the main advantages of NIL?
- What are the main disadvantages of NIL?
- How many applications of NIL can you name?

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Lecture 65: Line-Edge Roughness, part 1

- Define line-edge roughness (LER)
- What is the continuum approximation?
- Photon and concentration shot noise follow what probability distribution?
- How are the mean and variance related for a Poisson distribution?

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Lecture 66: Line-Edge Roughness, part 2

- What three stochastic components contribute acid uncertainty after exposure?
- Be able to use the 193-nm and EUV resist stochastic equation to work problems
- How can acid uncertainty in an EUV resist be reduced?
- Why is there an optimum acid diffusion length for minimizing LER?

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Lecture 67: Line-Edge Roughness, part 3

- What are the three terms of our basic LER model?
- How does polymer size affect those three terms?
- How does diffusion length affect those three terms?
- How does dose affect those three terms?

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Lecture 68: Directed Self Assembly, part 1

- Why does molecular self-assembly happen?
- What is a copolymer?
- What is a block copolymer?
- Explain microphase separation
- What is the Flory-Huggins interaction parameter and what does it tell us?
- What are the factors that determine the morphology of self-assembled block copolymers?

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Lecture 69: Directed Self Assembly, part 2

- What are the two common ways to create guide patterns for DSA in lithography?
- How is DSA likely to be used first in semiconductor manufacturing?
- How can DSA resolution be improved?
- What is the biggest problem for DSA in semiconductor manufacturing?

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