

# Unit 6 - Fundamentals of Fabrication Techniques contd...

## Course outline

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Introduction to MEMS-based Sensors

Fundamentals of Fabrication Techniques

Fundamentals of Fabrication Techniques contd...

Fundamentals of Fabrication Techniques contd...

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● Micromachining: Fabrication of VOC Sensor and Cantilever

● Chemical Vapour Deposition

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Application of Fabrication Technology

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Lab: Introduction to Equipments in Cleanroom

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## Week 4 Assessment

The due date for submitting this assignment has passed.  
As per our records you have not submitted this assignment.

**Due on 2019-08-28, 23:59 IST.**

1) A silicon wafer of 380  $\mu\text{m}$  thickness is doped (diffusion process) to a depth of 250 nm. Next process requires deposition of a silicon dioxide layer of 1  $\mu\text{m}$  thickness on the doped wafer. Which deposition technique can be used so that the deposition profile will remain unaltered? 1 point

- APCVD
- LPCVD
- PECVD
- MOCVD

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
*PECVD*

2) Rate of deposition of Chemical Vapor Deposition technique depends on \_\_\_\_\_ 1 point

- Gas phase diffusion of precursor
- Rate of reaction
- Temperature
- All of these

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
*All of these*

3) At high temperature, which of the following statement is wrong for CVD? 1 point

- Rate of deposition is inversely proportional to the square root of molecular weight of source gas
- Rate of deposition is almost constant with temperature
- Rate of reaction is inversely proportional to the molecular weight of the source gas
- The process is mostly mass transfer limited process

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
*Rate of reaction is inversely proportional to the molecular weight of the source gas*

4) Which of the following statement is true for APCVD? 1 point

- Low sticking co-efficient of deposited material gives better step coverage
- Only the chemical reactions occur at the surface
- Decomposition of precursors occur in gas phase before these reach the wafer surface
- All of these

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
*Low sticking co-efficient of deposited material gives better step coverage*

5) In low temperature regime of CVD, rate of reaction \_\_\_\_\_. 1 point

- does not vary significantly with temperature
- is very sensitive to temperature
- is very sensitive to molecular weight of precursors
- at surface of the substrate does not depend on crystal orientation

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
*is very sensitive to temperature*

6) Which of the parameter does not affect the CVD process? 1 point

- Precursors and their partial pressure
- Rate of carrier gas flow
- Activation energy of the precursors
- Length of the susceptor

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
*Length of the susceptor*

7) How problems due to boundary layer (stagnant layer) formation in APCVD can be overcome? 1 point

- The inlet can be connected to a mass flow controller to maintain a high flow rate
- The diameter of the susceptor can be decreased so that the increased flow rate will not allow to form boundary layer over substrates
- The wafer holder can be tilted at a certain angle to decrease the cross section of the susceptor gradually towards back
- All of these

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
*The wafer holder can be tilted at a certain angle to decrease the cross section of the susceptor gradually towards back*

8) At lower pressure, an increase in mass transfer co-efficient during LPCVD process will change the mode of operation. How will the process change? 1 point

- The system operation switches to the surface reaction-controlled regime
- The system operation switches to the mass transport limited regime
- The system operation switches to the diffusion limited regime
- None of these

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
*The system operation switches to the surface reaction-controlled regime*

9) In PECVD, the precursors are getting dissociated because of: 1 point

- Plasma
- Heat
- Plasma and heat
- Electron exchange with substrate

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
*Plasma and heat*

10) Sensitivity of a VOC sensor depends on \_\_\_\_\_. 1 point

- Temperature
- Cross-sectional area of sensing area
- Sensing material
- All of these

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
*Temperature*

11) Volatile organic compounds are formed from their respective liquids easily because of \_\_\_\_\_. 1 point

- Low diffusivity at room temperature
- Low vapour pressure at room temperature
- High vapour pressure at room temperature
- High sublimation temperature

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
*High vapour pressure at room temperature*

12) Which of the following statement is wrong? 1 point

- Wet etch process can give higher throughput than dry etch
- Using dry etch small feature size (~ 100 nm) can be processed faithfully
- Removal of sacrificial layer is easier by dry etch process than the wet etch process
- Dry etch process does both isotropic and anisotropic etching based on chemicals

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
*Removal of sacrificial layer is easier by dry etch process than the wet etch process*