Plasma Enhanced Chemical Vapor Deposition (PECVD)

MANUFACTURER : Oxford Instruments

MODEL : PlasmaLab System 100 - Modular PH2

Samples

- Samples size: maximum 152,4 mm (6”)
- Wafer uniformity: less than ± 5 %

Temperatures and Gases

- Temperature : ambient to 400 °C
- Gases : SiH_4, N_2, NH_3, N_2O, CF_4, Ar, O_2
- Pressure: 1 to 1500 mTorr

Characteristics

- Parallel plate configuration electrodes operating at 13.56 MHz
- 240 mm electrodes with automatic impedance tuning
- Shower head gas inlet optimized for PECVD Deposition
- Operating power: up to 600 W
- Electrodes gap is variable and controlled by the lower Electrode position
- “Frequency Mix” mode (500 W, 50 kHz-460 kHz on lower electrode) for stress control of the deposited films
- Fast loading via loadlock
- Chamber cleaning controlled via optical spectroscopy

ROUTINE PROCESS

Silicon Deposition

- Type of silicon: a-Si
- Thickness: minimum ~ 100 nm
- Deposition rate: ~ 25 nm/min
- Deposition temperature: >200 °C
- Mechanical stress: Low compressive (< 300 MPa)

MATERIALS SYNTHESIS AND SURFACE FUNCTIONALIZATION

INFRASTRUCTURE EN RECHERCHE
ET DÉVELOPPEMENT DU QUÉBEC

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ROUTINE PROCESS

Oxide Deposition

- Type of oxide: SiOx
- Thickness: ~ 50 nm to less than 10 µm
- Deposition rate: ~ 60 nm/min
- Deposition temperature: 400 °C
- Mechanical stress: ~ 50 MPa
- Refractive index : 1.47 < η < 1.55

SiC Deposition

- Type of SiC : SixC1-x (x ~ 0.5)
- Thickness : ~ 50 nm to more than X µm
- Deposition rate : ~ 50 nm/min
- Deposition temperature : 400 °C
- Mechanical stress: Compressive (100 MPa)

ROUTINE PROCESS

Nitride Deposition

- Type of nitride: SiNx
- Thickness: ~ 100 nm to less than 10 µm
- Deposition rate: > 10 nm/min
- Deposition temperature: 300 °C
- Mechanical stress: Low (~ 100 MPa)
- Refractive index : 1.99

Diamond-Like Carbon (DLC)

- Thickness: ~ 10 to 100 nm
- Deposition rate : ~ 10 nm/min
- Deposition temperature : ambient
- Mechanical stress: Compressive (> GPa)
- Mechanical hardness: 15 GPa