On-wafer Monitoring System

Real-time monitoring of plasma by on-wafer monitoring sensor
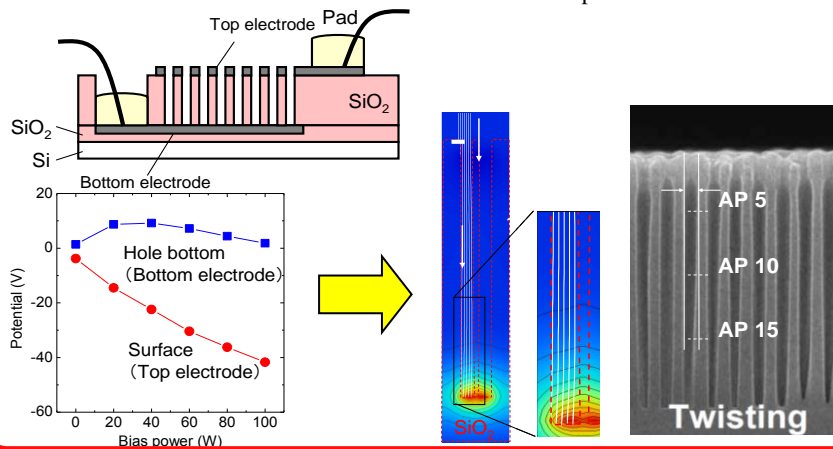

Plasma

ion sheath sensor

charge-up sensor
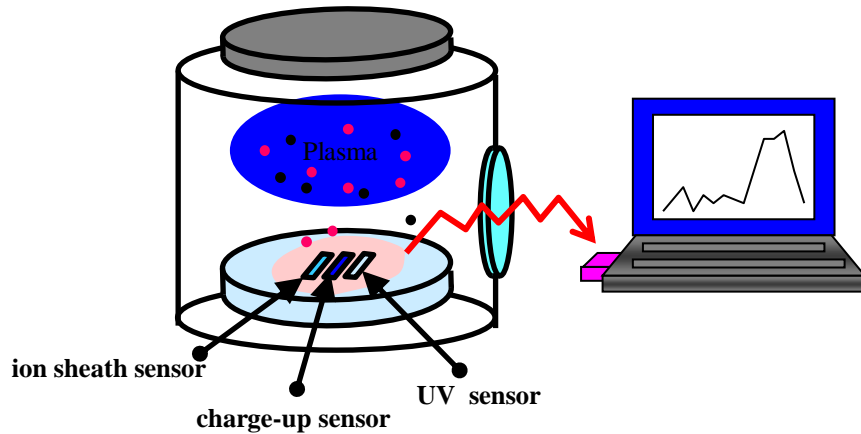
UV sensor

Ion sheath sensor

Estimation of ion sheath near substrate

Al_2O_3

Pad

SiO_2

Si

Al

plasma

ion sheath

photoresist

etched material

Ion incidence angle (degree)

— Simulation
● Experiment

Distance from step (μm)
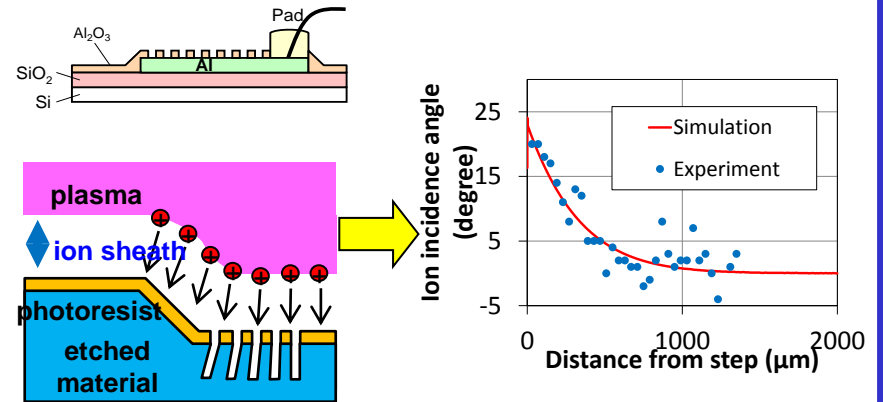
Charge-up sensor

Prediction of ion track within pattern

Top electrode Pad

SiO_2

SiO_2

Si

Bottom electrode

Potential (V)

Hole bottom (Bottom electrode)

Surface (Top electrode)

Bias power (W)

SiO_2

AP 5

AP 10

AP 15

Twisting

UV sensor

Prediction of UV spectra and UV damage from plasma.

UV/VUV (>E_g)

Pad

SiO_2

SiO_2

Si

Current

Poly-Si

CF4 plasma

Intensity

predicted

Intensity

actual

Wavelength (nm)

Etched profile

predicted   actual

Hard Mask

SiOC Low^{-k}

0   1e14