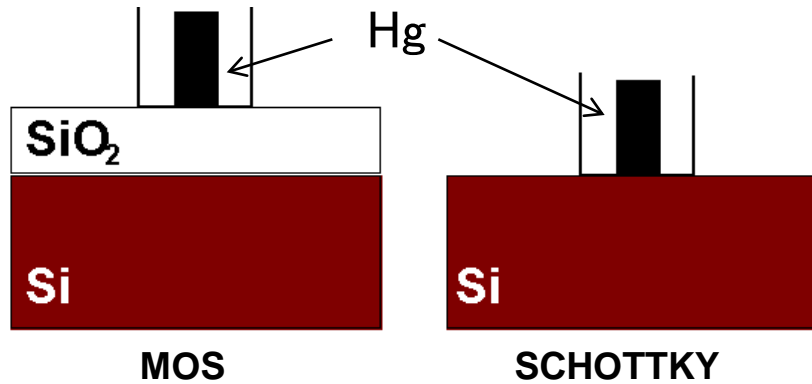


Electrical Characterisation of materials by Mercury Probe Capacitance Voltage Measurement (MCV)

1. Experimental



Electrical properties of semiconductors or dielectrics (Low-k, High-k materials) in MOS devices can be characterized by MCV without electrode deposition.

2. Applications and characteristics

Application

- Determining of Oxide Charge (VFB)
- Interface traps measurement (Dit)
- Resistivity profiling (ρ)
- Carrier density profiling (PID)
- Carrier life time measurement (τ_g)
- Permittivity / Relative dielectric condtant (ϵ / k-value)
- Dielectric integrity and reliability (TZDB, TDDB)

Characteristics

- Electrode deposition have no use due to Mercury Probe System.
- Good precision

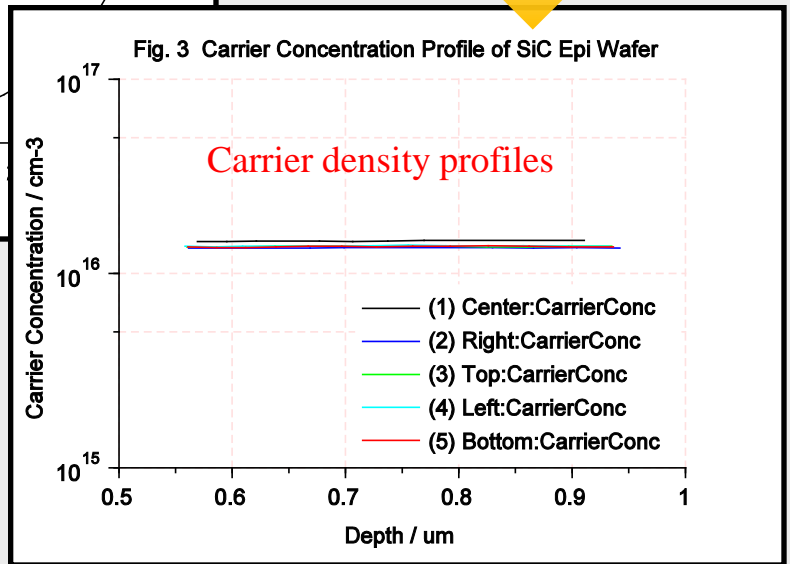
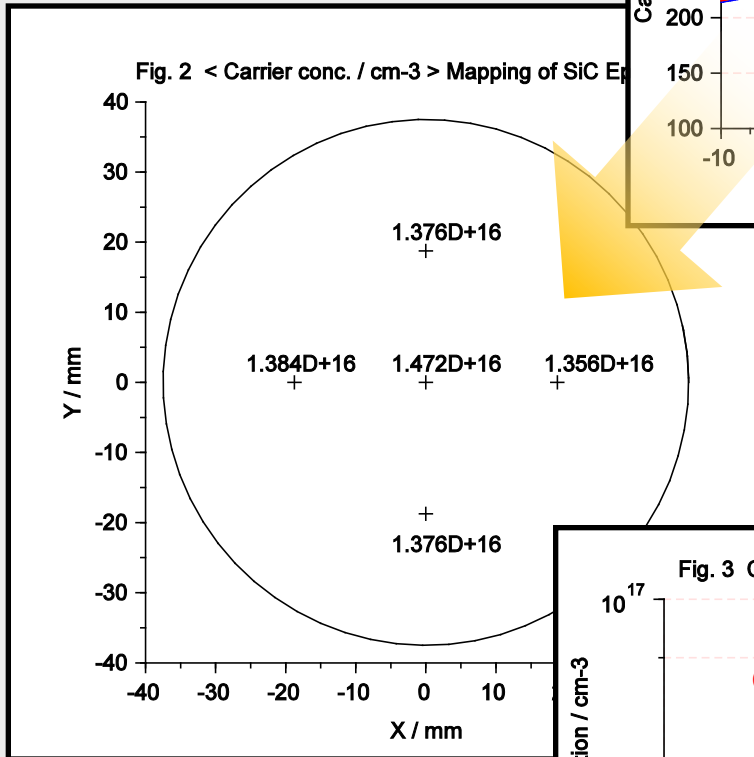
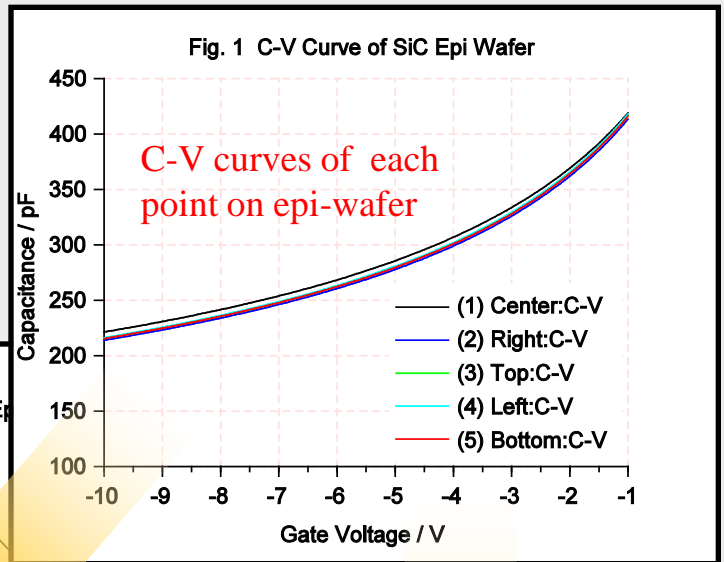
SCHOTTKY	: 0.3 % (1 σ)
MOS	: 0.1 % (1 σ)
- Good precision and sensitivity
- Mapping data of wafer can be obtained.



3. Depth profiling of carrier density in SiC epi-wafer by MCV

Carrier density profile is obtained from a slope of $1/C^2$ vs. V plot by mercury Schottky C-V.

Map of average carrier density



【Sample】

3inch SiC epi-wafer
 Epi-layer: n-type, 6.5μm
 Setup density: $2 \times 10^{16}/\text{cm}^3$

The C-V measurement indicates that our wafer is n-type. We can easily obtain some information about two dimensional distributions of the carrier density, and resistivity in SiC epi-wafers.

