

# SRA: Spreading Resistance Analysis (Two-Point Probe system)

## Probing

Spreading Resistance Analysis (SRA) is a technique used to analyze resistivity versus depth in semiconducting samples as a function of position. Two metal probes spaced about 20  $\mu\text{m}$  apart are pressed against the bevel surface of the semiconductor and the resistance between these probes is measured.

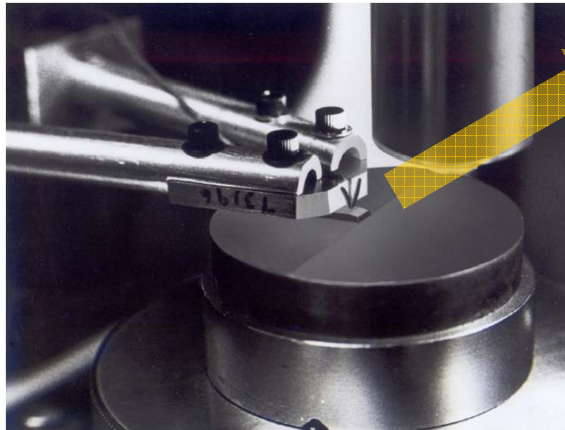


Fig.1 Birds eye view of SRA sample and probes

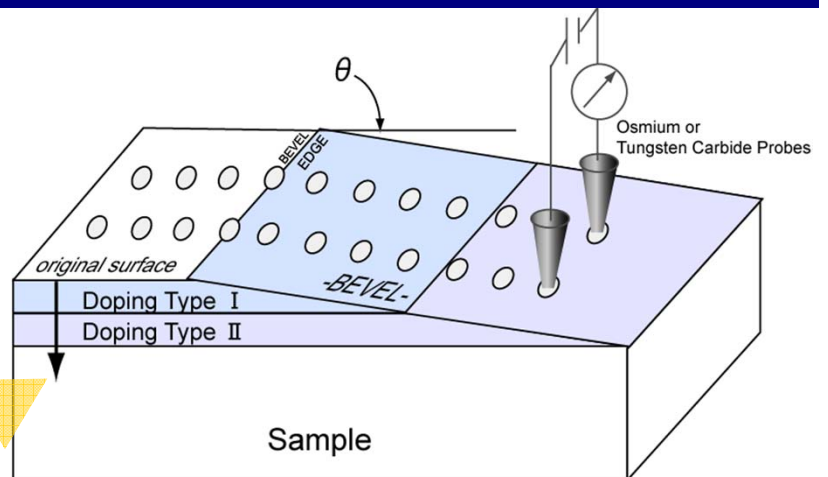


Fig.2 Example of SRA on a beveled sample

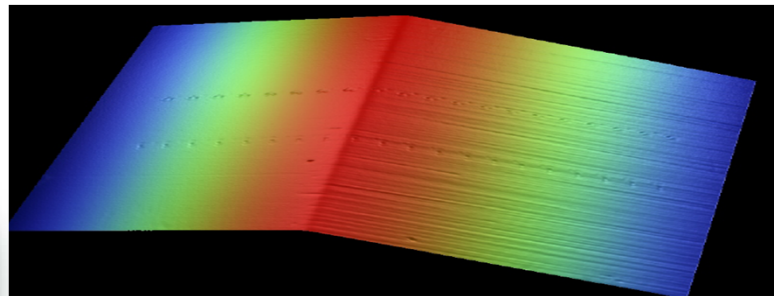


Fig.3 : Optical profilometer view of SRA on a beveled sample

### Measurable range

- carrier concentration :  $10^{13} \sim 10^{20}$  carrier /  $\text{cm}^3$
- resistivity :  $10^{-3} \sim 10^3 \Omega \cdot \text{cm}$
- depth : 100nm ~ mm order
- minimum area size : sub mm square
- substrate : Si, Ge, and SiGe

## Application: CMOS (P-channel Source-Drain)

Evaluation of the junction depth and depth profile of carriers is possible!

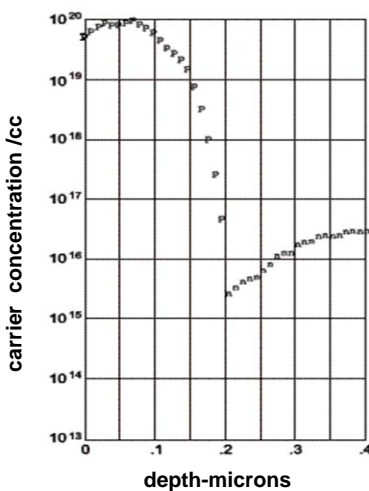


Fig.4 : Shallow profile near the source-drain

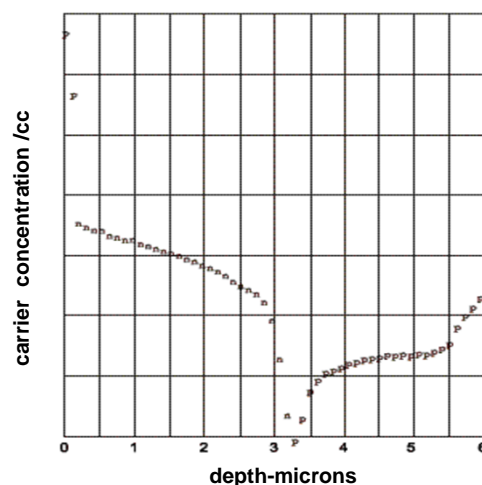


Fig.5 Steeper profiles (plotted on 2 depth scales) of the N-Well, Epi, and Substrate

