SUNYOU

For sample preparation in semiconductor failure analysis

Micro-plasma processing instrument

- Fast metal line exposure!

  Easy access to the failure points

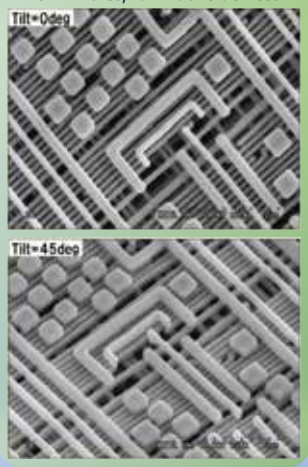
  Remarkably saving time for sample preparation

- Fast trench process (deeper than 100 μm)

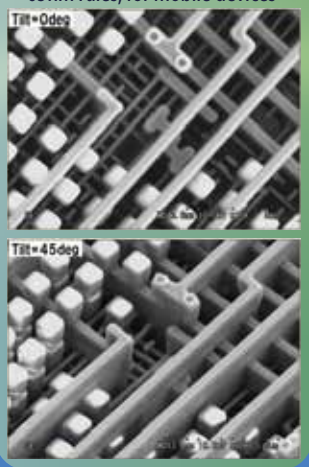
  100 times faster than FIB

Examples of metal line exposure

45 nm rules, for mobile devices



65nm rules, for mobile devices



Sanyu Co., Ltd.

Sanyu's micro-plasma processing instrument solves the following problems:

Difficulty in failure analysis associated with increased layers of metal lines of the latest LSIs, including the constraints of the EB tester analysis and lower sensitivity in EBAC technique.

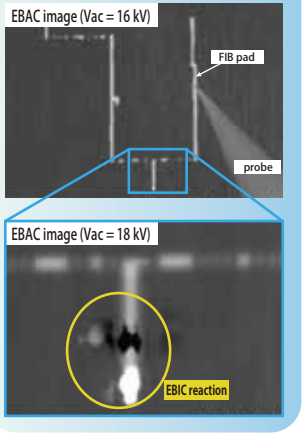
Costs and time for the trench milling of Si substrates in order to perform back-side analysis and pad construction therein, associated with the use of FIB.
They delay the TAT for the analysis and circuit edit and increase the costs of consumables.

Typical demonstrations of the micro-plasma instruments (metal line exposure)

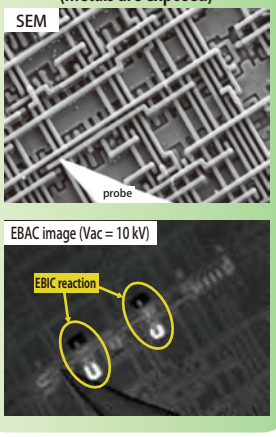
● Electron Beam Absorbed Current (EBAC) analysis

Exposed metal lines raise the contrasts in EBAC image, in which failure points are easily identified.

EBAC analysis with insulators

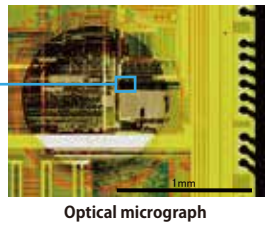


EBAC analysis after plasma process (metals are exposed)

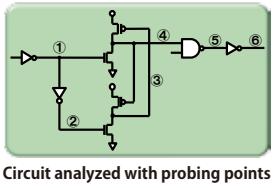


● Analysis of potential waveform using a EB tester

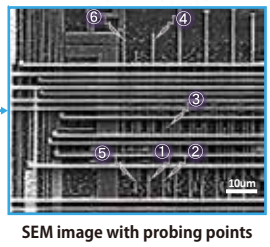
The analysis is possible without the formation of pads because insulating layers are removed. The waveforms obtained are clearer.



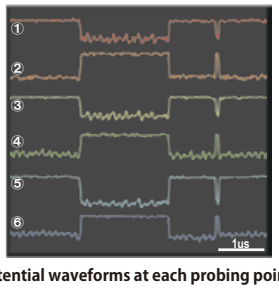
Optical micrograph



Circuit analyzed with probing points



SEM image with probing points



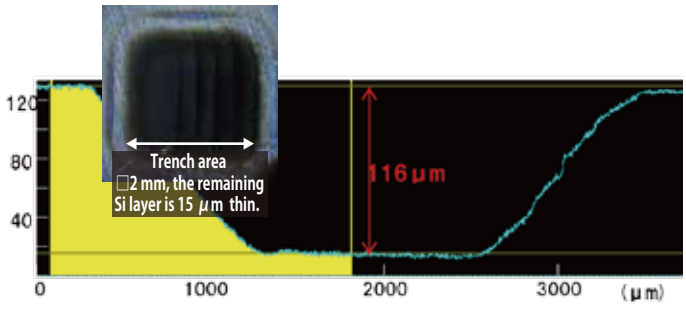
Potential waveforms at each probing points

Specifications

Model
MPE-510
Dimensions
Whole system: 1200 mm (W) x 800 mm (D) x 1800 mm (H)
Weight: 300 kg
Vacuum chamber: 420 mm (W) x 510 mm (D) x 386.5 mm (H)
Stage
5 axes (X, Y, Z, θx, θy)
Travels: X = 40 mm, Y = 130 mm, Z = 10 mm, θx, θy = ±1°
Resolutions: X, Y, Z ≦ 5 μm, θx, θy ≦ 0.1°
Sample size
Package: □14 mm, □20 mm, □24 mm
Chip: □6.5 mm, □10 mm, □15 mm
Process gases
CF_4 (0.1 MPa), N_2 (0.2 MPa), Dry Air (0.5 MPa)
Vacuum pump
Scroll pump (250 L/min)
Plasma
RF output: 50 W
Capillary available:
alumina with a inner diameter (at the tip) 0.5 mm ~ 4 mm
Materials to be removed
Si, SiO_2, W, Ti, Ta, PIQ, SiN

Trench processing

Process time for trench etching is greatly reduced.
Optically flat trenches deeper than 100 μm with a flatness of ±1 μm are obtained.
※etching rate ~3 x 10^6 μm^3/min



The specifications of the product are subject to change without notice.

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