

Three-dimensional Analysis by TOF-SIMS

Overview

TOF-SIMS (Time-of-Flight Secondary Ion Mass Spectrometry) is equipped with a sputtering guns (O₂, Cs) separately from a primary ion. Depth profile analysis is performed by repeated sputter etching and normal measurement. While depth profile analysis can also be performed by dynamic SIMS, AES and XPS (ESCA) etc., TOF-SIMS offer the following advantages over the other methods:

- Allows data collection without restrictions on the number of components. (When both positive and negative polarities are measured.)
- Allows three-dimensional imaging, and the extraction of two-dimensional images for any given location.
- Allows the extraction of a profile for any given location in the area under analysis.

Table 1 Features of different methods

| | TOF-SIMS | FE-AES | XPS | SIMS |
|---|-----------------------|-----------------------|--------------------------|-----------------------|
| Detection sensitivity | | | | |
| Retrospective analysis | | × | × | × |
| Minimum size and maximum depth | Several μm | <1 μm | Approx. 50 μm | Tens of μm |
| Under actual level conditions when measuring in depth direction | Several μm | Several μm | 1 ~ 2 μm | Tens of μm |

: Extremely useful
 : Marginally useful
 : Useful
 × : unmatched

Example: Three-dimensional analysis of TFT element

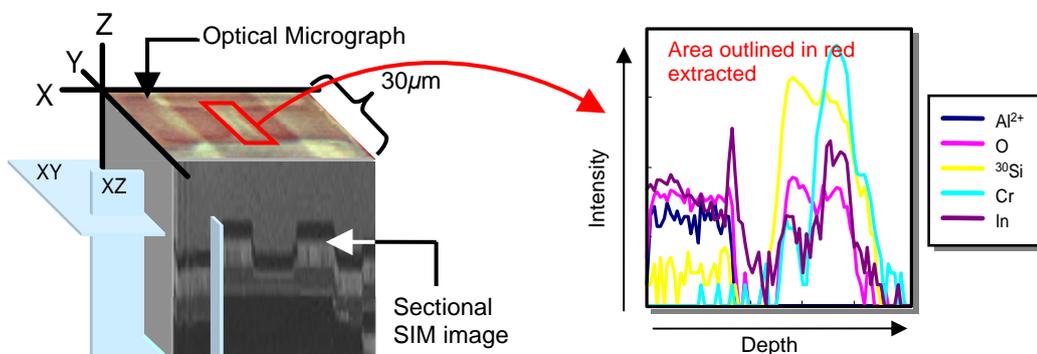


Fig.1 Depth profile.

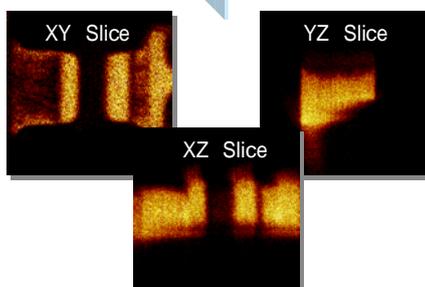


Fig.2 Two-dimensional slice images (Cr⁺).

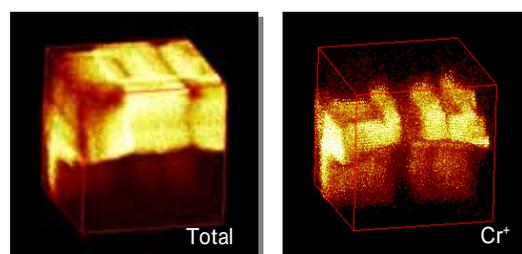


Fig.3 Three-dimensional images.

Created by SCAS: <http://www.scass.co.jp/analysis/pdf/tn339.pdf>

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| <p>Total solution partner for <i>analyses, measurements, and evaluations.</i></p> <p>SCASS</p> <p>SCAS SINGAPORE PTE LTD</p> | <p>[Laboratory] 17 Sakra Road, Pulau Sakra, Singapore 627886 [Office] 2 Jurong East Street 21, #04-02 IMM Building, Singapore 609601 E-mail: scass@scass.com.sg WEB site: http://www.scass.com.sg</p> |
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