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Panel Discussion

Characterization and Microanalysis of LSI Devices, Processes and Materials: Present and Future

Organizer/Moderator S. Kishino* and E. Arai**

* Musashi Works of Hitachi Ltd., 1450 Josuihon-cho, Kodaira, Tokyo 187, Japan

** Atsugi Electrical Communication Laboratory, Nippon Telegraph and Telephone Public Corporation, Atsugi-shi, Kanagawa 243-01, Japan

Table 1 Discussion Theme and Respective Panelists

Discussion Theme		Panelist	Affiliation
Device and process constraints in submicron VLSI, and demands for characterization and microanalysis	from device performance	E. Arai	NTT
	from process technology	K. Sekido	NEC
Surface and interface analysis		T. Hattori	Musashi Inst. Tech.
TEM sectional observation		M. Kawamura	Hitachi
LSI failure analysis by strobe-SEM		K. Ura	Osaka Univ.
Ultra microanalysis of impurities in LSI materials	by P. L.	M. Tajima	Electrotech. Lab.
	by SIMS	C. Evans	C. Evans Assoc.
Contamination prevention and protection of processing rooms, gases, and drugs		H. Muraoka	Toshiba

High-density and high-performance circuits have been developed in silicon LSI technology. In the near future it is expected that submicron devices will be applied to leading memory devices. As device and process technologies are scaled to achieve performance and density improvements, a number of constraints come into play. Of these, there are many process and material constraints, besides device constraints which are well understood by device technologists.

In order to overcome these constraints, characterization and microanalysis technology of LSI devices, processes, and materials must be developed. Of these characterizations, surface and interface analysis such as a combination of Si and SiO_2 etc., depth distribution measurement of shallow junctions, microanalysis of ultra low density impurities, diagnostic analysis of device performance, three-dimensional analysis including sectional observation of small devices, quick nanometer-scale measurement of LSI patterns, non-destructive measurement of processes and devices, contamination prevention and protection of processing rooms, gases & drugs and so on are present.

Without breakthrough in some basic characterization technologies, submicron VLSI devices could not be fabricated. Even if submicron devices are developed in a laboratory, they could not be easily produced with such an acceptable production yield as before.

This panel discussion has been planned to discuss these problems and to find the first step towards the development of the submicron VLSI. The panel includes two

kinds of technologists as listed in Table 1. One group consists of scientists who actively investigate physics of materials. They are not necessarily familiar with LSI devices and processes. Other members are technologists who are actively involved in LSI development. Through discussion between these scientists and technologists, perhaps we can hope for the advent of some technological innovations in materials, in processes, and in device designs.