

총회초청 1

DEVELOPMENT OF VACUUM EQUIPMENT INDUSTRY FOR MICROELECTRONICS INDUSTRY

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During the last 15 years, semiconductor microelectronics industry in the world has accomplished a striking progress in the integration technology from 64Kb VLSI to 64Mb ULSI. However, in the back of this progress, we can not overlook a great deal of contribution of innovative works in the vacuum equipment industry. On the other hand, vacuum equipment industry has enjoyed a tremendous growth of market in this period due to the huge capital investment of semiconductor industry.

In this presentation, the author would like to review the development of Si wafer fabrication vacuum systems such as thin metal deposition and plasma etcher in connection with the escalation of technical requirement in the alternation of device generation. The most strong driving forces for the progress of systems were wafer size increase in 2 times from 4 inches to 8 inches and pattern size decrease in one order from 4 μm to 0.4 μm .

The second topics is several innovations in vacuum pumps, components and materials which have been worked out to meet the severe

requirements of microfabrication process. Oil-free and dust-free vacuum became a fundamental prerequisite of all ULSI production vacuum systems. Dry pump replaced oil sealed rotary pump, and oil diffusion pump was completely replaced by turbo-molecular pump or cryopump. The belt conveyer mechanism for wafer handling was replaced by vacuum robot to avoid the contamination. "Ultra-Clean" technology was adopted for surface finishing of gas tubing and components to keep dust-free vacuum.

In the presentation, typical examples of these developments mainly in Japan will be explained by the help of O/H slides and photographs.