

Key Technologies for Advanced Devices



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THE eye-opening progress we have seen in electronics and in information and communication has come from the innovative development of advanced devices such as semiconductor memory. Needless to say, device technology is implemented through the coordinated efforts of researchers in various fields of general technology such as materials, design, processes, implementation, and evaluation. The Hitachi Group is vigorously engaged in the development of innovative key technologies in each of these fields, utilizing our strength in technical integration.

For example, the lithographic techniques used for patterning in semiconductor fabrication continue to defy optical limits on creating ever finer microscopic patterns. Pattern design techniques that take lithographic characteristics into account, in other words, the combined use of simulation techniques and measurement tools for design and fabrication, are becoming essential. In process technology, processing systems that can cope with new materials are also essential. We believe that DFM (design for manufacturing) solutions for semiconductor measurement instruments and insulation layer etchers and plasma processors that can handle new materials can contribute to the 32-nm generation and later devices for which R & D (research and development) has been accelerating in addition to the 45-nm generation devices

that are already in mass production.

In addition to the implementation of advanced functions and the reduction of costs in electronic devices, power semiconductors for automobile electronics and other such devices that must maintain high reliability under severe operating conditions are increasing in importance. In our efforts to develop production facilities that are reliable, efficient and inexpensive, we are developing and supplying various kinds of facilities that enable application of the most advanced technologies to products ranging from consumer devices to industrial equipment. In addition to developing leading-edge semiconductor devices, we are developing substrate mounting system products that will enable fast, high-density mounting. We are also developing businesses in the field of liquid crystal devices and are developing and commercializing the most advanced large-substrate mounting systems.

In cooperation with companies within and without the Hitachi Group, we are moving forward with vigorous R & D for organic semiconductor devices and other post-silicon devices and are actively working toward timely provision of fabrication and inspection systems. I am confident that the dedicated efforts of the Hitachi Group in the development of advanced technologies and a variety of systems will benefit our readers.