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Early 2000s

Transition to 300-mm wafers

~ Process Technology ~

In the early 2000s, the advanced device mass production lines were shifted from conventional 8-inch wafers to 300mm wafers with the area of 2.25 times that of 8-inch. At the same time, the 300mm dimensional standard was established as the world standard replacing 12-inch standard. (The 8-inch wafer also became the 200mm wafer from this time.)
The main purpose of the wafer size increase to 300mm was to reduce the chip cost, and the requirement to the equipment was “equivalent processing speed” and “equivalent equipment cost” compared to 200mm. At the same time higher performance was also required, so it took certain amount of time for the transition.
The world's first semiconductor factory that mass-produced devices with 300mm wafers was Trecenti Technologies (Hitachi-naka City, Ibaraki Prefecture), established as a joint venture between Hitachi and UMC in March 2000, and it started mass production in March 2001. In this factory, short TAT was pursued by adopting a single wafer production system, and it was the state-of-the-art 0.13μm process line, targeting at the success in system LSIs.
Meanwhile, in April 2001, the Asuka Project including Selete was launched, promoting R&D at Tsukuba Super Clean Room to help promote 300mm technologies for mass production lines in Japan. After that, 300mm factories were made one after another, and by 2005, all the major semiconductor companies in Japan started the operations; Toshiba (flash memories in Yokkaichi and system LSIs in Oita), Fujitsu (system LSIs in Mie), Elpida (DRAM in Hiroshima), and NEC (system LSIs in Yamagata).
As the equipment technology, handling of wafers shifted from open cassette of 8-inch and AGV transfer to wafer transfer by FOUP (sealed type box). In addition, improvement of process technologies necessary for large diameter, reduction of particles necessary for miniaturization, etc. were promoted, and the conversion to single wafer processing in various processes such as cleaning were promoted, too.
On the other hand, demand was still strong for batch type vertical furnaces and others in the memory production lines, and it was also this time that memory and system LSI productions had differed needs.

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