Heard on the Beat: SEH, Ibis to bring SOI to masses

By C.V. Dee - February 13, 2004

Can Japanese silicon wafer giant SEH bring silicon-on-insulator (SOI) technology into the mainstream?

Last week, Ibis Technology Corp., a supplier of SOI wafers and equipment, announced a big order for its ion implanters. The company's SOI technology is called SIMOX. Ibis did not identify the customer and a company spokesman declined to comment.

Bill Ong, an analyst with American Technology Research Inc., believes that Ibis received an order for its SOI-enabled implanters from Japan's Shin-Etsu (SEH), the world's largest silicon wafer supplier. Ibis' implanters reportedly sell for $8 million each. The value of the deal could reach $16 million or more.

The order could propel SOI from a niche to a mainstream technology. SEH is one of the few silicon wafer makers to move into SOI and the Japanese company has the potential and capacity to bring the technology to the masses.

"Ibis recently announced an order for one 300mm i2000 SIMOX implanter to a major wafer manufacturer," Ong wrote in a report. "We believe this tool order could be from Shin-Etsu (SEH), the largest wafer maker, to be used for process evaluation and qualification with the option for a second tool order later in the year," Ong said.

"This order is a breakthrough for Ibis as wafer makers have to seriously consider deploying SOI capability as 65-nm appears to be on the roadmap for chipmakers such a Sony and Toshiba along with earlier interest from IBM," Ong said.

Other wafer makers will follow. "We expect other wafer makers such as Sumco, Wacker, MEMC and others will need to accelerate their plans for SOI evaluation in order to stay competitive to SEH," he said.

At present, Ibis sells both equipment and wafers, although the company mainly focuses on developing and pushing its SIMOX-enabled implanters in the market. Customers include IBM Corp. and others.

Ibis' strategy differs with Soitec, which focuses on supplying SOI wafers. "We believe as SOI gets incorporated by the early chip adopters, microprocessors and DSPs, both the Ibis SIMOX method and the Soitec wafer bonding method will be deployed until chipmakers reach the necessary learning curve to arrive at their preferred SOI method," Ong said.

"For thick-SOI applications, wafer bonding has a considerable throughput advantage as SIMOX
oxygen implants take a long time to implant oxygen deep into the bulk silicon to still allow a thick top silicon layer," he said. "However, the trend towards thin and ultra-thin SOI puts SIMOX at an advantage as oxygen implants can be embedded at a more shallow level," he said.

Soitec has some advantages. "The wafer bonding method commonly used is Soitec’s SmartCut method whereby two oxidized silicon wafers are pressed together and fused inside a furnace. However prior to the fusion, one of the wafers is implanted with hydrogen to establish the 'breakline' for predetermined thickness of the top silicon portion of the SOI wafer. When the fused wafer sandwich is treated with heat, the implanted hydrogen line breaks and thus forms a top layer silicon on oxide over bulk silicon (a SOI wafer)," he said.

"The SIMOX process pioneered by Ibis is a simpler and more precise method to make a SOI wafer. A bulk silicon wafer is simply implanted with oxygen at the desired depth to form SOI. Thus we believe the trend toward thin and ultra-thin SOI wafers makes SIMOX the preferred method as design features reach 65-nm and below," he added.