Members' Profiles

Sumitomo Precision Products Co., Ltd.

1. Overview of business activities

In 1995, the British firm Surface Technology Systems (STS), an affiliate of Sumitomo Precision Products Co., Ltd., marketed the world's first silicon deep etching unit. Building on this unit and its technology, Sumitomo Precision Products became the first Japanese manufacturer to produce a silicon deep etching unit, the MUC-21 ASE, in 2001. In 2006, Sumitomo Precision Products also began domestic manufacture of the silicon dioxide film etching unit, which uses HF vapor, of the U. S. firm Primaxx (which became funded by Sumitomo Precision Products in June of this year), in order to better respond to the MEMS needs of its customers.

Sumitomo Precision Products also handles a wide range of MEMS processing units, including SiO2/SiN etching units, SiC etching units, compound semiconductor etching units, PE-CVD units, silicon sacrifice layer etching units and units for wafer thickness reduction.

2. Domestic products designed for MEMS mass production

(1) MUC-21 ASE Pegasus (new silicon deep etching unit)

The ASE Pegasus is Sumitomo Precision Products' most advanced model and was released in December 2005. It is based on the so-called Bosch switching process, as well as the Advanced Silicon Etch (ASE) technology established by STS by combining various proprietary technologies. The resulting hardware module and processing software offer superior performance that maximizes such switching process features as high etch rate, high mask selection ratio and high aspect ratio processing.

Specifically, the unit offers greatly improved etching shape and in-plane distribution through the use of a newly developed plasma module, as well as an improved plasma matching system and a new type of gas introduction system that includes an MFC capable of high-speed switching processing. The result is a product that offers world-class performance. Moreover, Sumitomo Precision Products continues to focus on development in an effort to achieve further improvements in the future.

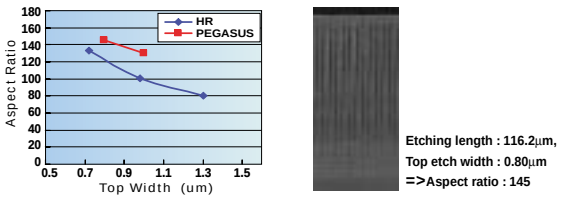

Fig. 1 Example of silicon high aspect ratio etching

(2) VPX-ASE Pegasus (platform for mass-production factories)

In 2007, Sumitomo Precision Products released the VPX-Pegasus cluster type ASE unit for users interested in the mass production of MEMS devices.

In this system, the ASE-Pegasus source is mounted on a cluster type conveyor system. Sumitomo Precision Products is confident that this system will make a major contribution to the production of various types of MEMS sensors, silicon microphones, silicon oscillators and other components already making the transition from the research and development stage to the mass-production stage.

Fig. 2 VPX-ASE Pegasus

(3) APS (SiO2/SiC high-speed etching unit)

Released last year, the APS system employs the highly reliable MUC-21 domestically produced platform and includes a newly developed Advanced Physical Source (APS) plasma source. It enables high-speed etching with SiO2 and SiC and is attracting particular attention for its application in the SiC etching of LEDs, semiconductor components and next-generation power devices. In the SiC etching process, the APS achieves a high etching rate of 4.2 μm/minute or greater. In addition, the mask selection ratio is high, and the side wall angle can also be controlled.

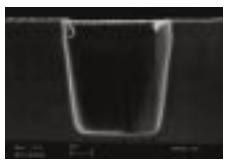

Fig. 3 Example of SiC high-speed etching

(4) SLE (Si oxide film sacrifice layer dry etching unit)

Removal of the sacrifice layer is a typical MEMS process that involves extremely tiny moving parts. Building on the basic concept of the MEMS-CET silicon oxide film etching unit (which uses HF vapor) produced by the American firm Primaxx, Sumitomo Precision Products designed a domestically produced chamber and officially released it domestically in 2006 under the name SLE. The SLE system achieves a high-speed, stiction-free release configuration employing a silicon oxide film sacrifice layer at a low cost. It also offers high selectivity with regard to aluminum, enabling maskless etching even with wafers that have exposed aluminum pads.

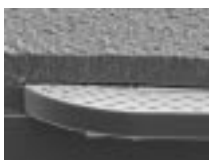

Fig. 4 SOI sacrifice layer etching (in the case of a silicon resonator) (Image provided by SiTime)

3. A final word

Sumitomo Precision Products has a voluminous process library accumulated over many years, centering on silicon deep etching technology. The company is building systems that can respond rapidly to the extremely diverse needs of any MEMS user company. MEMS devices are now being are employed for an ever-widening variety of purposes.

By developing a diverse array of applications and equipment, Sumitomo Precision Products will continue to provide the means to respond rapidly to MEMS development needs.

For more information about Sumitomo Precision Products, access the SPP website at: http://www.spp.co.jp

MICRONANO is published quarterly by Micromachine Center (MMC) to promote the international exchange of information related to micromachines, R&D and other technical topics, and is circulated free of change. Please send your comments about **MICRONANO** to the publisher :

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Date of Issue : October 30, 2007