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WaferMasters Introduces New Flash Annealing System for Sub-90nm Semiconductor Technology Manufacturing

Chipmakers can enhance ultra-shallow junction device performance by using WaferMasters' Flash-300 Annealing System for high, diffusion-free activation of dopants in critical USJ applications.

SAN JOSE, California — WaferMasters, Inc. today introduced its new FLASH-300 annealing system for forming ultra-shallow transistor junctions of 15 nm or less. The system is applicable to high-performance memory and microprocessor devices.

The new system enables chipmakers to increase device speed using a single process chamber that employs innovative RTP flash technology for activating ion-implanted dopants. The FLASH-300 addresses the important technical requirements necessary to achieve high dopant activation without diffusion, thus realizing the desired junction depth.

Advanced 90-nm node devices require highly conductive ultra-shallow transistor junctions to meet the performance specifications established by the ITRS 2002 Roadmap. Conventional tungsten lamps, spike annealing, and laser-based systems have limited capability for achieving these specifications. Limitations include insufficient energy to instantaneously activate high concentrations of boron, and thermal stresses due to localized heating on the wafer. With the FLASH-300, the entire wafer is heated uniformly in exposure times that range from tenths of a millisecond to several milliseconds.

The FLASH-300 annealing system provides critical technology to optimize dopant activation and preserve junction integrity. Utilizing proprietary Xe-based ultraviolet radiation, optimum rapid heating of the wafer surface activates shallow implanted dopants with no diffusion. Through a controlled lamp discharge, a Soft-Flash™ anneal is provided that lowers thermal stress and enables tailored recrystallization of the implant layer and junction abruptness. The integrated vacuum system provides a controlled environment, permitting a wide range of applications. In addition, broad process flexibility is achieved through precise control of ultraviolet energy, its rate of delivery to the wafer surface, and preheating of wafer.

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The FLASH-300 meets the needs of the 90-nm node and beyond. Its primary use is for annealing and electrically activating implanted dopant species such as boron, BF₂, arsenic, and phosphorous in the making of shallow sources and drains of transistors. Other applications are being developed to address the conditioning of wafer surfaces to promote improved surface adhesion of deposited films and formation of low-resistance interconnects — that is, silicides from metals combined with silicon. With the advancement of low-k dielectrics between interconnected layers, modification of the molecular structure could be achieved to enhance the electrical and structural properties of low-k film. This same technology can be applied to conditioning of high-k materials.

Productivity and cost of ownership are critical issues in selecting chipmaking tools. The FLASH-300 delivers significant process benefits combined with low operating costs and high reliability. The benefits of FLASH-300 technology have been demonstrated to several customers, and the first 300-mm system will be delivered in December to a major Japanese semiconductor manufacturer. The 200-mm version of the FLASH platform is also available.

About WaferMasters, Inc.

WaferMasters, Inc., founded in 1999, is a privately held manufacturer of thermal production tools used to fabricate advanced semiconductor devices. Reduced process monitoring and high equipment utilization, together with minimum consumables usage and maintenance contribute to the lowest COO in the industry for RTP equipment. WaferMasters, Inc. maintains headquarters at 246 East Gish Road, San Jose, California 95112. Visit WaferMasters at SEMICON/Japan 2003, Booth 2-A304, or on the web at www.wafermasters.com.

Trademarks: Soft-Flash is a trademark of WaferMasters, Inc.

CONTACT: WaferMasters, Inc.
Joseph A. Nava (408) 451-0859