

A start-up firm develops a better optoelectronic wafer and wants to process the backside without disturbing the frontside. But the devices on the backside are too sensitive to undergo the thinning processes that immerse the entire wafer in etching fluid. Here is a product that allows single-side processing with high yield and at low cost.

WaveEtch™

How It Helps: WaveEtch™ single-sided wet processing system safely thins wafers and shaves production costs. One advantage of WaveEtch's single-sided processing of microelectromechanical and optoelectronic devices is that it does not affect the side of the wafer with structures or devices already on it. A second advantage is that WaveEtch does not create subsurface damage, thereby protecting applications that are repeatedly heated and cooled or subject to mechanical stress. A third advantage is high yield. Other processes that can thin wafers to equivalent levels involve a two-step process—mechanically grinding down the wafer to a certain level, and then chemically thinning the remainder. Such grinding techniques produce low yields and drive up the costs of chip production. A fourth advantage is the system's low capital cost and cost of ownership, which can be a fraction of comparable tools.

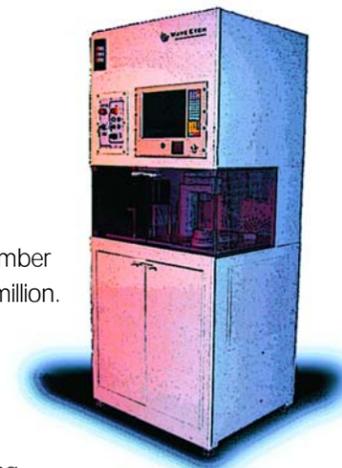
How It Works: The WaveEtch single-sided wet processing system uses a patented process, called dynamic confinement technology (DCT), to thin semiconductor wafers. DCT uses fluid dynamics to confine solutions that "eat away" or etch a wafer surface. This process has been qualified for wafers from 625 microns to 50 microns thick, and can work with virtually all semiconductor materials. It is a cost-effective, high-yield approach to reducing large-area, high-quality substrates with no front-side damage. Only the side being thinned is touched by the solution.



How Much It Will Cost: Depending on options and the number of processing stations, prices range from \$400,000 to \$1.7 million. These prices are one-third to one-tenth that of other thinning processes.

When It Will Be Ready: The system is available now. With more industries moving towards single-sided wafer processing, WaveEtch makes the perfect platform to tap this upcoming and fast-growing market. In fact, some of the world's top 50 wireless, optoelectronic, and high-frequency communication device manufacturers are now using WaveEtch technology to create charge-coupled devices, focal plane arrays, optical nanostructures, and other optical and optoelectronics components.

Who Is Working On It: The innovator is Materials and Technologies Corporation (Matech), incorporated in 1992. The company intends to be an industry leader in developing single-sided wafer processing systems. It employs 10 people and occupies 5,000 square feet of office and manufacturing space in Poughkeepsie, New York. For more information, contact Dr. Ricardo I. Fuentes of Matech at (845) 463-2799 or fuentes@matech.com. The company Web site is www.matech.com.






MDA Origins

BMDO funded the development of Matech's wafer-thinning process to produce wide bandgap silicon carbide (SiC) substrates for high-power, high-frequency radar applications. A thinning process that would strip away the sacrificial layers on SiC substrates was required, but not commercially available. In 1996, BMDO awarded an SBIR Phase I contract to Matech to show feasibility and demonstrate DCT to produce large-area SiC-on-insulator-compliant substrates for low-defect, lattice-matched, wide bandgap semiconductor growth. In 1997, BMDO awarded an SBIR Phase II contract to Matech to further develop the DCT process for direct commercialization.

