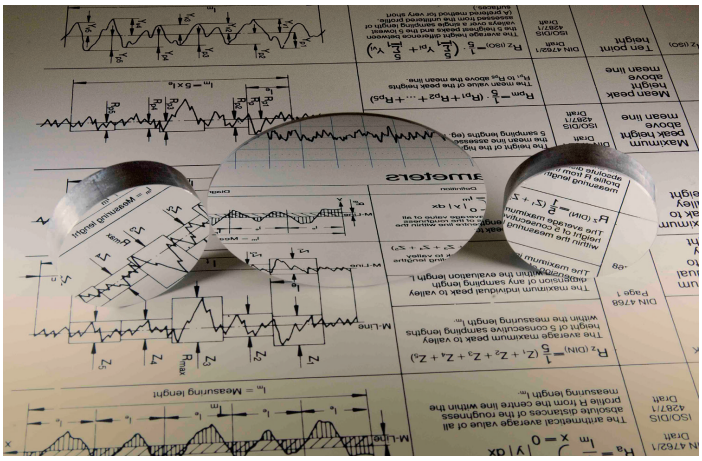
DESIGN 2 PART

By Rebecca Carnes

# High Precision Processes Set Finishing Company Apart



Surface Finishes has developed a process for producing monolithic aluminum mirrors with Angstrom level surface roughness using a proprietary Chemical Mechanical Planarization (CMP) technology. Photo courtesy Surface Finishes.

The ability to perform high precision work combined with unique technologies is what sets Surface Finishes apart from its competition, according to company representatives. By leveraging its Advanced Nanoscale Surface Technology™ and its ScatterStop™ processes, the company can accomplish intricate work on challenging materials.

ITAR registered Surface Finishes, a subsidiary of Cabot Microelectronics, has developed a process for producing monolithic aluminum mirrors with Angstrom level surface roughness using its proprietary Scatterstop™ technology. Monolithic aluminum mirror use is often limited to IR wavelengths because single point diamond machining does not yield surface quality sufficient for visible and UV applications. Surface Finishes' proprietary ScatterStop™ polishing process produces superior optical performance in demanding applications, enabling the use of monolithic aluminum mirrors in UV and visible wavelength applications, said Daniel McMullen, director of business development. And the results are better performance than SPDT aluminum or electroless nickel on aluminum, he said.

The ability to achieve this level of finish on monolithic (solid aluminum with no additional reflective metal coating) aluminum eliminates the need to nickel coat the parts. This improves the reflectivity and durability of the mirror. The engineering challenge was in developing a process to polish a soft metal without scratching, pitting, or otherwise degrading the quality of the surface finish. The company combined its traditional high precision finishing capabilities with CMP (chemical mechanical planarization) technology from its core semiconductor materials business, McMullen said.

"ScatterStop was the result of leveraging CMP technology developed in our core business for polishing aluminum interconnects that re used to wire together the millions or billions of individual transistors that make up an advanced microprocessor or memory chip. We combined this with our existing precision manufacturing technology to create the ScatterStop process," he said.

The company works with hard and soft metals, optical glasses, ceramics, plastics, single crystal materials, and a variety of performance coatings. Surface Finishes' ability to achieve superior tolerances and surface finishes comes from the experience and craftsmanship of the employees, custom built equipment, and the application of CMP technology to enhance traditional finishing technologies, McMullen explained.

The company's investment in metrology enables measurement and validation of performance. "We have recently invested in new processing and metrology equipment to be used for the production of engineered and specialty substrates. The rise in applications such as sensors, LEDs, and power devices has created a need for new novel materials and engineered substrates," McMullen said. "Given our experience in wafer processing for the semiconductor industry, our experience in working with a wide range of materials, including single crystal materials, alloys, refractory metals, and coatings in our Surface Finishes business and our core semiconductor materials business, it was a natural extension of our capabilities."

Cabot Microelectronics Corp., headquartered in Aurora, Illinois, is a major supplier of CMP polishing slurries and a growing CMP pad supplier to the semiconductor industry. The company's products play a critical role in the production of advanced semiconductor devices, enabling the manufacture of smaller, faster, and more complex devices by its customers. Surface Finishes (www.surfacefinishes.com) has two locations in Aurora and Addison, Illinois.

The term Advanced Nanoscale Surface Technology™ is used to describe the company's ability to produce high quality surface finishes on challenging materials, incorporating the company's expertise in Chemical Mechanical Planarization (CMP) technology from its core business, Cabot Microelectronics, McMullen said. The company uses the term ScatterStop™ to describe the application of this finishing technology to the optics industry where scattering is an important consideration in system design and performance, he said.

"We have positioned the business to be on the leading edge with emerging materials and applications. Whether it is advanced optics, engineered substrates, or alternative coatings and materials, our goals are to enable the development and refinement of technologies for our customers by providing high quality, high precision finishing and fabrication services," McMullen said.

*This article is a reprint from the October 2013 issue of Design-2-Part magazine.*