Brewer Science® Lithography Technologies

Solutions to Enhance Semiconductor Manufacturing

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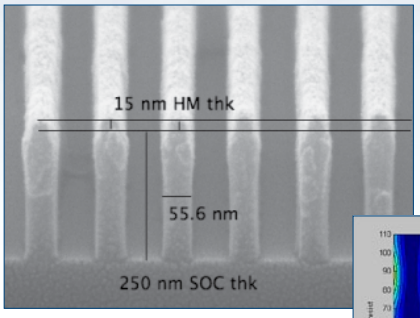
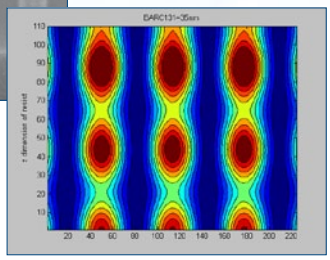
Brewer Science® ARC® materials have provided a unique pathway that enables photolithography processes from 2 µm down to 22 nm and beyond for over 30 years, allowing device manufacturers to extend equipment capabilities and save on capital investment. We have expanded upon our ARC® technologies by creating materials and process systems for immersion lithography, double patterning, developer-soluble bottom anti-reflective coatings (DBARCs), EUV lithography, and Brewer Science® OptiStack® systems.

OptiStack® Lithography Optimization Systems



<< *High-aspect-ratio features created using OptiStack® lithography optimization systems*

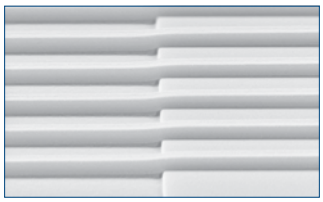


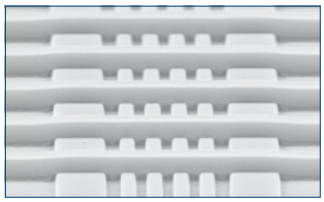
>> *OptiStack® modeling software accurately predicts litho results for sub-20 nm processing*

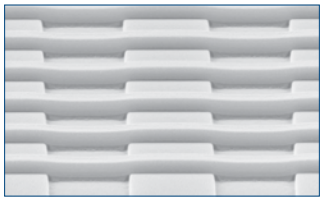
Brewer Science® **OptiStack® lithography optimization systems** are industry-proven solutions used in advanced lithography integration schemes, and are the leading choice for sub–20 nm processing, providing a practical alternative to EUV processes. OptiStack® systems enable:

- High-aspect-ratio imaging
- Universal applicability to any substrate
- Lithography tool life extension
- Improved inventory and processing efficiency
- Process flexibility

Developer-Soluble Bottom Anti-Reflective Coatings (DBARCs)







<< *ARC® DS-A520 DBARC greatly reduces or eliminates CD swing and reflective notching caused by underlying topography*

Brewer Science® **developer-soluble bottom anti-reflective coatings** eliminate the BARC open etch step and improve CD control. DBARCs work with standard lithography processing tools and can be used in FEOL and BEOL applications where a traditional BARC is used, such as:

- Ion implant
- High-k metal gate processes

Where innovation takes flight!℠

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Brewer Science Innovation

Brewer Science invented and introduced ARC® anti-reflective coatings that have made significant enhancements to the lithography processes used in the manufacture of computer chips and other microelectronic devices. The company has grown to dominate the world's supply of anti-reflective coatings. Over the past several years, the company has expanded to develop and manufacture specialty materials and processes for applications outside lithography, such as etch protection, thin wafer handling, optical coatings, gap fill and high-aspect ratio planarization. Our diverse product portfolio enables the fabrication of many micro-devices for products including GPS systems, gaming systems, and medical diagnostic devices. We also have a manufacturing facility dedicated to the production of electronics-grade carbon nanotube solutions.

By constantly focusing on our customers' future needs and substantially investing in research and development, Brewer Science has helped customers move past technical and business barriers with revolutionary technology solutions that have expanded their capabilities to address new challenges and succeed in their market spaces.

Our people and culture are what set Brewer Science apart. We encourage people to take risks by trying the unknown. We do what people say "can't be done" or "won't be accepted" by the industry and marketplace. This approach leads to innovative material and process solutions that change the world. When Dr. Brewer invented the anti-reflective coating for semiconductor device processing, he was told that no one would ever accept a process change that added additional steps and materials. The alternative was an expensive piece of equipment that had extremely low throughput. With much persistence, the use of ARC® materials became the standard for lithography processing. Today, 30 years later, Brewer Science's push for what, at the time, was considered to be a counterintuitive solution has saved the semiconductor industry hundreds of billions of dollars. We continue to push the technology limits with materials and processes that take device manufacturers to the next step without this enormous capital investment. We always provide our customers with more than the direct material value.

The biggest change in the market is the diversification of applications. We adapt to these changes by listening in order to understand the underlying needs in broad market segments, and we invest our advanced R&D efforts in those areas that mesh well with our core competencies in materials and process innovation.

Our strategy in the current economic climate is to continue investing in the resources needed to stretch the boundaries of innovation and meet customer needs. Brewer Science will continue to expand and increase our international "footprint."

We are privately owned with offices in the United States, Taiwan, China, Korea, Japan, United Kingdom, France and Germany.