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Technologists revise list of critical EUV litho issues

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DALLAS — Technologists revised a list of issues deemed critical to the development of next-generation lithography at a meeting Thursday (Oct. 17) at the International EUV Lithography Symposium. The issues were ranked based on a vote by 18 technologists from the 12 member companies of International Sematech and by representatives from European and Japan-based research consortia.

The output power of the light source for extreme ultraviolet (EUV) lithography was voted the top issue by the technologists, who revise the list annually. The laser and gas discharge sources of EUV light now put out about 5 to 10 watts of power, but that needs to be increased to 100 watts for high throughput lithography, said Chuck Gwyn, program director of EUV LLC (Livermore, Calif.).

EUV lithography is now the only next-generation lithography program endorsed by Sematech, which no longer pursues projection e-beam lithography.

Second on the revised list was the manufacture of defect-free EUV mask blanks and patterned masks. Particles as small as 50 nanometers can ruin a patterned mask. Work on repair techniques, such as ion milling and e-beam localized heating, are being pursued to repair EUV masks, but the creation of defect-free masks is the goal.

Reliability of both source and condenser optics was ranked as the third most critical issue. Debris from EUV radiation can destroy the mirrors in the condenser which collects photons in an EUV system, and Gwyn said a near-term goal of at least several months of mirror lifetime is required.

EUV photoresists were added to the list for the first time. Cost of ownership was voted an "overriding" issue, but one that would be solved if individual technical challenges were met. Contamination control, and thermal management were also listed as challenges.

Besides the Sematech representatives, technologists working at Europe's Medea+ program, France's CEA-LETI, Japan's ASET consortium and the Japanese EUV lithography Association participated in the vote.