INNOVATION PARTNERSHIPS
UNIVERSITY OF MICHIGAN

Plasmonic Lithography for Patterning High Aspect-Ratio Nanostructures

TECHNOLOGY NUMBER: 7036

OVERVIEW

High spatial frequency components in plasmonics and metamaterials for nanolithography

- Manufactures patterns with density and size beyond the light diffraction limit
- Creates smaller feature sizes, improved feature aspect ratios, and greater uniformity

BACKGROUND

Metamaterials are engineered to have special properties that are generally not found in nature. They use repeating patterns at scales much smaller than the phenomena they influence. Metamaterials have applications in nanolithography, which is the production of patterns with features on the nanometer scale. Nanolithography is the foundation for microelectronics, though semiconductor technology increasingly requires methods that can reduce the size and cost of product components. Advances in plasmonics and metamaterials for nanolithography allow smaller features to be produced with larger aspect ratios and improved uniformity, and a need exists for improved approaches in this realm.

INNOVATION

Researchers have created a technology that exploits the high spatial frequency components of specially designed masks in plasmonics and metamaterials to produce patterns with density and size beyond the light diffraction limit. This technology creates smaller feature sizes, improved feature aspect ratios, and greater uniformity than those which are achieved in existing nanoscale patterns. Theoretical analyses and simulation-based data support the claimed improvements. The technology favorably impacts the microprocessor industry, the pattern-based magnetic storage industry, and the MEMS industry.

Technology ID

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Category

Manufacturing Process
Engineering & Physical Sciences
Semiconductors, MEMS, and Electronics

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PATENT APPLICATION

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References

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