MITSUBISHI GAS CHEMICAL COMPANY, INC.

March 9, 2009

MGC develops MGR Series, a new low molecular resist material for EUV lithography applications

World's highest resist performance

Suitable for both positive and negative applications

Application of aromatic aldehyde development and mass production technology

Mitsubishi Gas Chemical Company, Inc. ("MGC") today announced its MGR Series, a new low molecular resist material for application in extreme ultra-violet ("EUV") lithography, which is expected to be used in the commercial production processes for next-generation 22nm semiconductors.

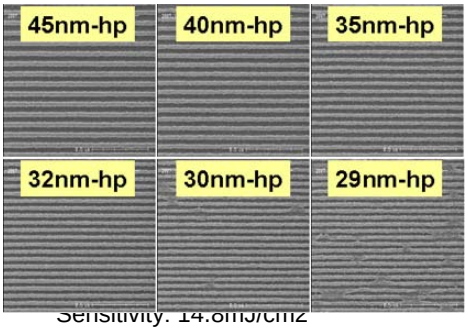
The MGR Series uses aromatic aldehyde as its main material, for which MGC has proprietary development and commercial technology. It simultaneously meets the three requirements of photoresist material for EUV, namely high resolution, high sensitivity, and low LWR/ LER. Since it has one-tenth the molecular weight of conventional polymers, the MGR Series reduces line width roughness (LWR) and line edge roughness (LER). It can be used as either a positive-type or negative-type resist.

An EUV exposure evaluation carried out with the cooperation of Semiconductor Leading Edge Technologies, Inc., a production technology development consortium funded by Japan's semiconductor industry, showed that negative-type photo resist that uses MGR108 had the world's highest performance (see diagram 1). The positive-type material has been confirmed to have the same characteristics as the negative-type material.

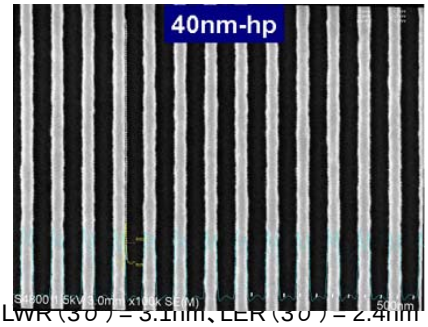
One problem commonly faced in EUV lithography is "outgas," the gas emitted due to resist decomposition at the time of exposure; MGR Series has been verified to produce low levels of outgas.

Based on the above findings MGC has begun sample shipments of MGR108. The most recent results of this research were announced at SPIE Advanced Lithography 2009, an international conference which took place in California, U.S. from February 22 to 27, 2009, and are generating considerable interest throughout the industry.

It is expected that EUV lithography will be adopted for the mass production of next-generation 22nm semiconductors from around 2014. MGC will accelerate its research into improving and developing MGR Series toward realizing its adoption in EUV photoresist applications and thereby enabling new levels of miniaturization.



Sensitivity: 14.8mJ/cm2

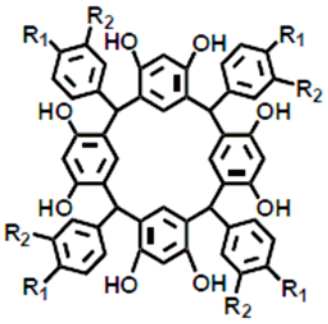


LWR (3σ) = 3.1nm、LER (3σ) = 2.4nm

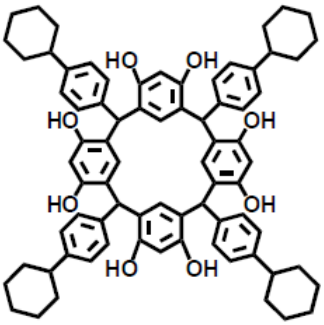
Sensitivity：54μC/cm2

Diagram 1: Performance evaluation of negative-type photo resist using MGR108
EUV exposure pattern (left) and EB 40nm pattern (right)

For reference:



Basic structure
(Phenylcalix [4] resorcinarene)



MGR108

Diargram 2: MGR Series structure

Glossary:

Extreme ultraviolet (EUV) lithography
Technology that uses extreme ultra-violet (EUV) light of a frequency of 13.5nm to form circuit patterns on silicon wafers. Photoresist for EUV applications needs to simultaneously fulfill three requirements: high resolution, high sensitivity, and low LWR/ LER. However, since it usually involves some degree of compromise between these three characteristics, the development of photoresist is a key priority issue in EUV lithography.

LWR (line-width roughness)**/ LER** (line-edge roughness)
Roughness or unevenness in circuit pattern line-width or line-edge. Roughness in circuit patterns can cause disconnections or shorts in the circuit.

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