

Bottom Anti-Reflective Coating Composition

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ABSTRACT

A method (100) to fabricate novel vinyl ether crosslinker based bottom antireflective formulation for 248 nm lithography is demonstrated. The method (100) includes the first step (110) by synthesizing terpolymer (104) comprised of an anthracene unit (102) as chromophore and carboxylic acid functionality (103) as cross-linking site. Further, the next step (120) includes the synthesis of crosslinker (106) comprised of vinyl ether functional group (104) which is tetrafunctional (105) in nature. The method in the next step includes the preparation of BARC formulation by dissolving the terpolymer and crosslinker in propylene glycol methyl ether and propylene glycol methyl ether acetate solvent mixture. The method (100) in the next step (130) includes the spin coating of vinyl ether crosslinker based bottom anti-reflective formulation composition (107) applied on a silicon substrate and thermally crosslinked through baking at 190 - 230 oC followed by successful patterning trials with commercial hotoresist applied over the bottom anti-reflective coating.

KEY APPLICATION AREAS

- Semiconductor Manufacturing.
- Photolithography (248 nm) Processes.
- Microelectronics & Integrated Circuit (IC) Fabrication.
- Advanced Lithography Materials Development.
- MEMS and Microfabrication Technologies.

POTENTIAL USE

1. Bottom anti-reflective coatings (BARC) for 248 nm photolithography.
2. Reducing standing waves, CD swing, and reflective notching.
3. Improving critical dimension (CD) control in semiconductor patterning.
4. Enhancing photoresist compatibility and pattern fidelity.
5. Minimizing reflectance from silicon substrates for high-resolution lithography.
6. Preventing resist thickness loss during fabrication processes.