Deposition of Super-Micron Particles for Creating Photomask Calibration Standards

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INTRODUCTION

Electrostatic deposition of dry particles on wafers and photomasks is a proven method for creating calibration standards for inspection and metrology tools. Technology for depositing particles from 10 nm to 2 µm is mature, providing precise control of:

- Particle diameter (Dp)
- Particle count (N)
- Deposit pattern width (spot diameter Ø)
- Deposit pattern location (X, Y)

New inspection applications requiring periodic calibration are emerging with a focus on detection and measurement of super-micron particles, up to 100 µm in diameter.

Super-micron particles on the backside of the photomask or stepper/scanner stage can impact focus quality during the photolithography process.

DEPOSITION OF POLYSTYRENE SPHERES (2 – 20 µm)

CONCLUSIONS

Controlled deposition of 2-20 µm calibration particles has been demonstrated for the first time. Control of particle charge may improve spot size control and reduce contamination between deposits.

REFERENCES