

In-die Metrology on Photomasks for low k1 Lithography

Dirk Beyer, Ute Buttgerreit, Thomas Scheruebl,
Carl Zeiss SMS GmbH, Carl-Zeiss-Promenade 10, 07745 Jena,
Germany

Abstract

New lithography techniques like Double Patterning, Computational Lithography and Source Mask Optimization will be used to drive immersion lithography to its limits. This results in several challenges for the mask maker. The extremely high MEEF values amplify small process variations on the mask features on the wafer. Complex mask features using sophisticated OPC and assist features as well as double patterning tightens the registration and CDU specification at the same time. Especially, overlay becomes more and more critical and must be ensured on every die. In-die registration and CD metrology on arbitrary features is required to measure mask performance precisely. In this paper an overview about several in-die metrology techniques will be given. Application of in-die CD measurements using the Zeiss WLCD tool as well as in-die registration measurements using the Zeiss Prove tool will be shown and discussed.

Keywords:

Metrology, in-die, registration, CD metrology, Aerial Imaging