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SUB-RESOLUTION ASSIST FEATURE TOLERANCES FOR CONTACT WINDOWS USING 193 nm LITHOGRAPHY

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Combining assist features with appropriate off-axis illumination conditions can significantly improve depth of focus and uniformity of critical dimensions of contact windows. It is known that sub-resolution assist features modify the environment of isolated features in a fashion that they appear dense. In recent years the impact of assist features was mostly studied for gate-level lithography. In this work the placement and dimension control of assist features for contact windows are examined and analyzed using 193 nm lithography in conjunction with state-of-the-art single layer resist. Our study is primarily performed for 160 nm contact windows, and it is based on experimental data obtained from critical dimension measurements with varying focus, exposure dose, and in different environments. Along with optical proximity corrections we use the off-axis illumination technique to increase the depth of focus of contact windows and improve the overall process latitude.

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ENHANCED MICROLITHOGRAPHY USING COHERENT MULTIPLE IMAGING

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Coherent multiple imaging is a potential method to enhance both the depth of focus and resolution in optical microlithography. During this process, images of the original mask pattern are generated by a Fabry-Perot etalon located behind the real mask and imaged by the projection lens simultaneously. With this technique, the phase and amplitude conditions strongly determine the final image profile, since the electric fields and not the intensities of the images are added together.

This report describes how coherent multiple imaging can be investigated by means of a commercially available photolithographic simulation software. It was demonstrated that an appropriate pupil plane filter could play the same role as a Fabry-Perot etalon placed between the projection lens and the mask.

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DETECTION OF CARBON MONOXIDE FROM BIOLOGICAL TISSUE USING DIFFERENCE FREQUENCY GENERATION IN PERIODICALLY-POLED LITHIUM NIOBATE NEAR 4.6 MICRONS

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Recent work appears to indicate that carbon monoxide (CO) produced by heme oxygenase may also play a role as a physiological messenger similar to nitric oxide.