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Mask design and fabrication of Micro/Nanowire biochip for reliable and repeatability pattern transfer

Abstract

In Micro/Nanowire fabrication, the alignment and exposure process are the most critical steps in photolithography process, and indeed for the whole biochip processing. This process determines the success of transferring the Micro/Nanowire design pattern on the mask to the photoresists on the wafer surface. Hence, the resolution requirementsand precise alignment are vital; each mask needs to be precisely aligned with original alignment mark in order to transfer the original pattern from mask onto photoresist layer. Otherwise, itcant successfully transfer the original pattern to the wafer surface causing device and circuit failure. Therefore, the UniMAPs Second Generation Mask Aligner is used for precise alignment and pattern transfer process. Thus, the paper present a preliminary study on fundamentals of resist exposure and development mechanisms for fabrication of Micro/Nanowire, We demonstrated significance of considering process parameters such as mask aligner, quality of resist, soft bake, exposure time and intensity, and development time. There was a very little room for alignment error; we were able to achieved error free design to the criticaldimension.

Keywords; Biochip, Critical Dimension, Mask Aligner, Microwire, Pattern Transfer