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Internship/graduation assignment at MESA⁺ NanoLab cleanroom

Introduction

This document concerns an intership/graduation assignment of 6-8 months at the MESA⁺ NanoLab cleanroom of the University of Twente. The assignment is entitled *Determining the optimal exposure parameters for photoresists using a direct maskless writing system*. Goal is to determine optimal exposure parameters for various photoresists using a maskless direct writing system.

Determining the optimal exposure parameters for photoresists using a direct maskless writing system

In the MESA⁺ NanoLab cleanroom various lithography systems are available for generating patterns with typical sizes ranging from a few nanometers to (tens of) microns. Recently a system (Heidelberg MLA150; see image below) for maskless exposure of photoresist, i.e. without use of a mask, is installed, by means of which patterns with a minimum width of 0.6 µm can be written. This machine is in particular suitable for rapid prototyping and R&D.

During the assignment pattern-generation in various photoresists needs to be optimized. Aspects such as 1:1 translation from design-dimensions to realized dimensions have to be studied, as well as verticality of the sidewalls of patterns in photoresist. Moreover, the type of substrate onto which the resist is coated might be of influence on the writing results.

For this assignment a variety of cleanroom equipment has to be operated, such as wet benches, the direct writing lithography system, ellipsometers, profilometers, microscopes anda Scanning Electron Microscope (SEM). In order to be able to operate this equipment independent, the Cleanroom Trainings Program will be followed, as well as several (short) courses for operating specific equipment.