

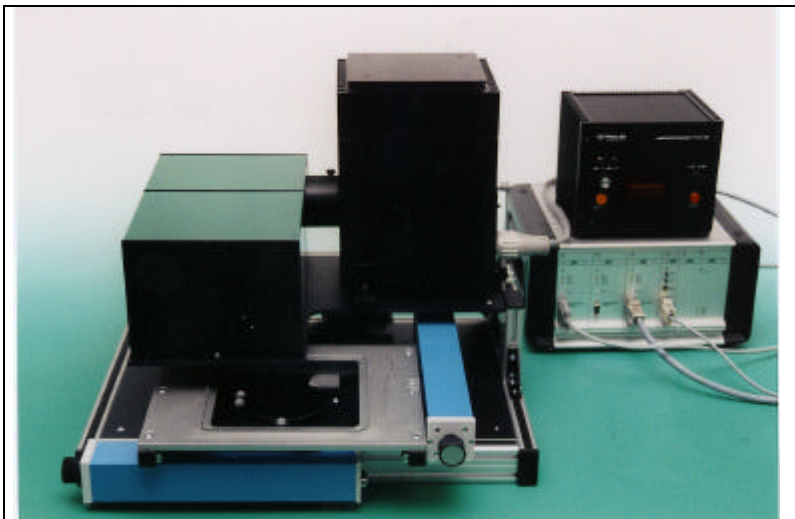
Resist characterisation

The multi-channel development rate monitor LMP and the exposure unit BEL

The measuring instrument for characterising the photo lacquer consists of the exposure unit BEL and the multi-channel development rate monitor LMP.

The measuring instrument helps to draw conclusions about the parameters of resists such as the sensitiveness and gradation and the influence of different developers on the dismantling behaviour. Furthermore the Dill parameters A, B and C can be measured as entry parameters for the photo lithography simulation.

1. The exposure unit



Picture 1: Exposure unit with a cross table (150 x 150 mm) and an HBO 100 lamp

The exposure unit consists of a stepping motor-driven cross table (150 x 150 mm), a source of light, an illumination optics, a dose meter for the exposure and the Windows steering software "WAFBEL".

The samples, usually wafers, can be positioned on the cross table. The source of light is an HBO 100 lamp. With the help of the image optics a size-adaptable field screen which is illuminated by an HBO lamp can be depicted on the wafer.

The comfortable Windows software WAFBEL steers the cross table and the screen so that automatic dose rows can be produced.

The exposure models are menu-steered and can easily be generated; they can be stored in configuration files and recalled upon request. This ensures a simple and time-effective work. The exposure parameters such as the position, the size and the distance of the spots are freely eligible.

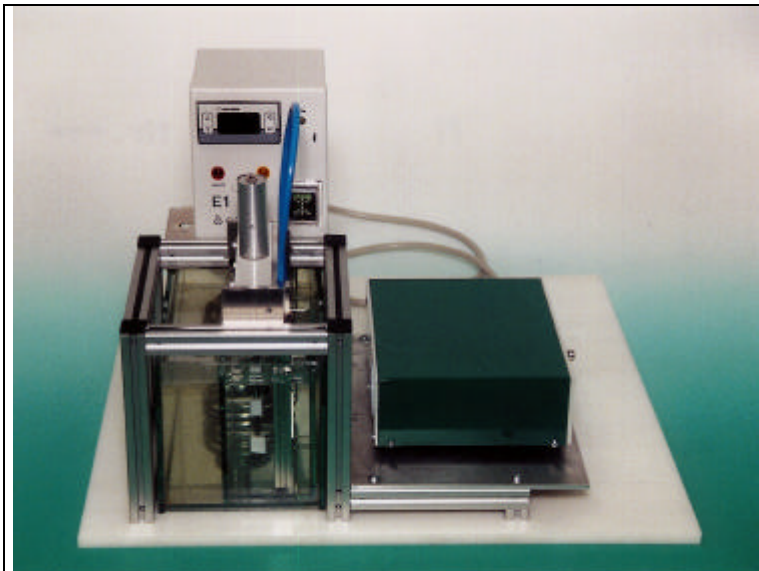
The software has got options to balance out the positions of the wafer fixture and the screen to ensure an exact exposure.

The option "ABC Parameters" is available as an additional module. The so-called Dill parameters for actinic and parasitic absorption and photochemical sensitiveness can be determined with the help of the exposure unit BEL by using resist-coated quartz plates. The software measures the time-depending transmission behaviour and calculates the parameters mentioned above.

The calibration of the measurement diodes for the dose amount and the measurement of the transmission is steered by the software.

2. The development rate monitor LMP-16 and the Windows software LSR

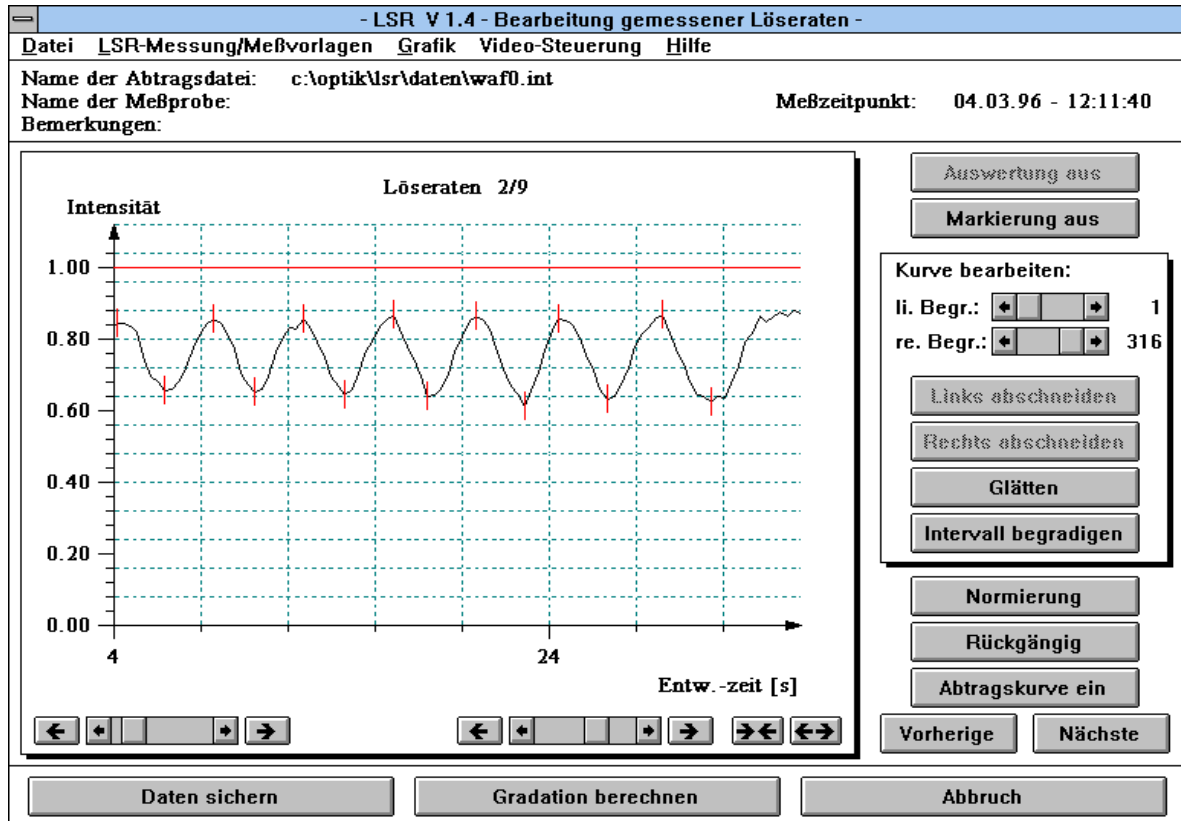
In addition to the exposure unit BEL there is also the development rate monitor LMP with the software LSR which generates dismantling and gradation curves with the help of illuminated lacquer samples.



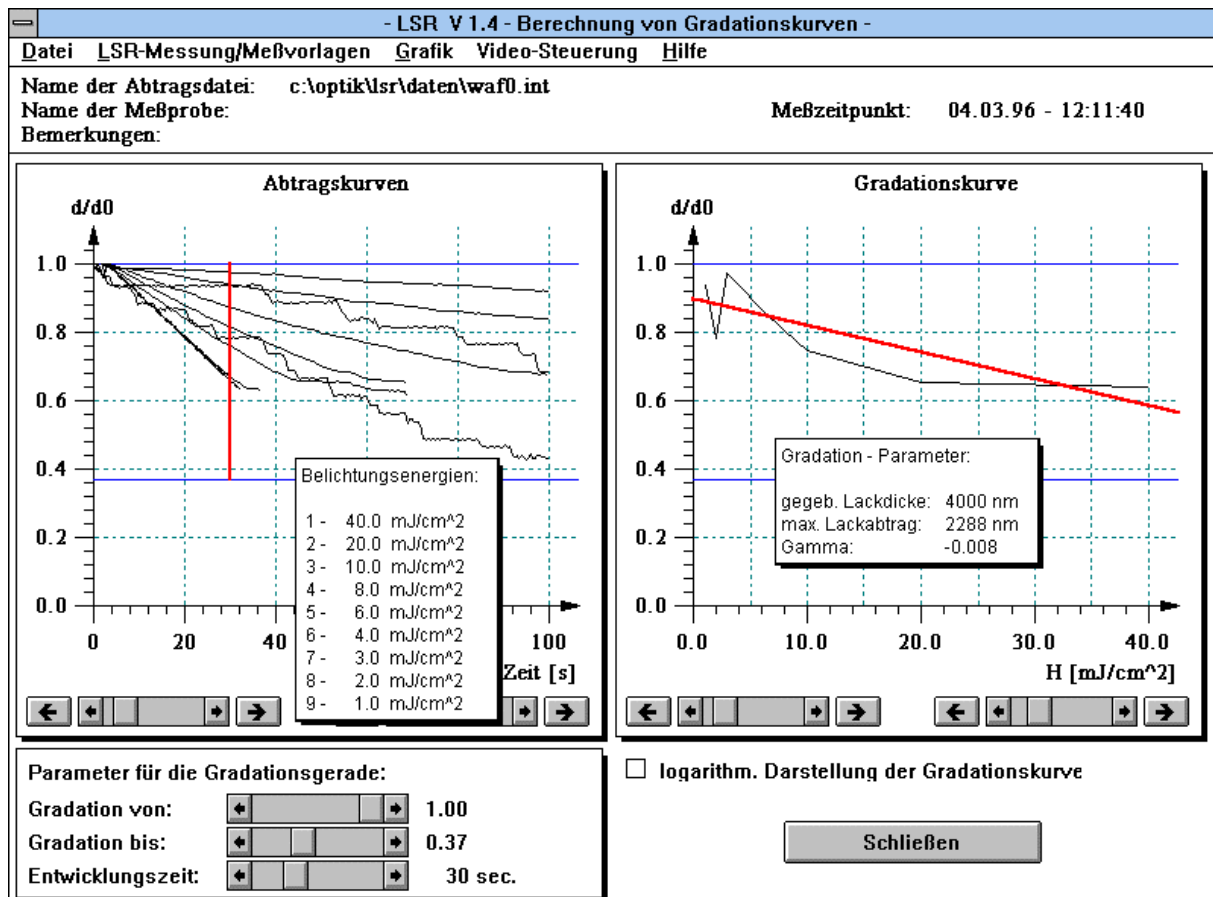
Picture 2: Development rate monitor consisting of a developing tank and a module for recording the measuring result

The LMP consists of a developing tank in which a pump ensures a constant flow proportion. The illuminated lacquer dots are depicted on a CCD camera via an optics; the illumination leads to interference at thin layers which is caused by a coherent radiation source. The interference produced by the lacquer dismantling is registered for all channels by the CCD camera, recorded by an image processing system and saved in measurement files. After the measurement has been finished, the measurement curves are used to calculate the dismantling and gradation curves.

The Windows interpretation software LSR belongs to the development rate monitor package.



Picture 3: Intensity distribution for the resistant dismantling measured with the help of LMP



Picture 4: Dismantling function and gradation calculated with the help of the intensity distribution