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Novel method to quantify resist outgassing induced contamination rates

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One of the challenges for EUV Lithography is molecular contamination and lifetime of EUV optics. In order to make EUV economically viable, optics lifetime should be in the range of 7-10 years (tens of thousands of illumination hours). TNO is working in this field for deveral years, together with ASML/Carl Zeiss SMT AG.

One of the uncertainties in assessing optics life time is resist outgassing. Currently, EUV induced resist outgassing is measured by RGA or cold trap methods. The molecular outgassing rate is presented in total number of molecules outgassed per cm^2 per second. However, there is no clear correlation made between (composition of) the outgassing mixture and its impact on optics degradation.

Therefore, a method was developed to measure optics contamination induced by resist outgassing in a more direct way. The method involves exposure of a few square meters of resist in the vicinity of simultaneously exposed optics. To do this, a dedicated apparatus has been built.

In this presentation we will show the method in more detail and discuss the results obtained for the resist MET 2D.