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# The optics contamination / lifetime program: an overview of supporting facilities


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## Introduction

### EUV Optics Lifetime Challenge

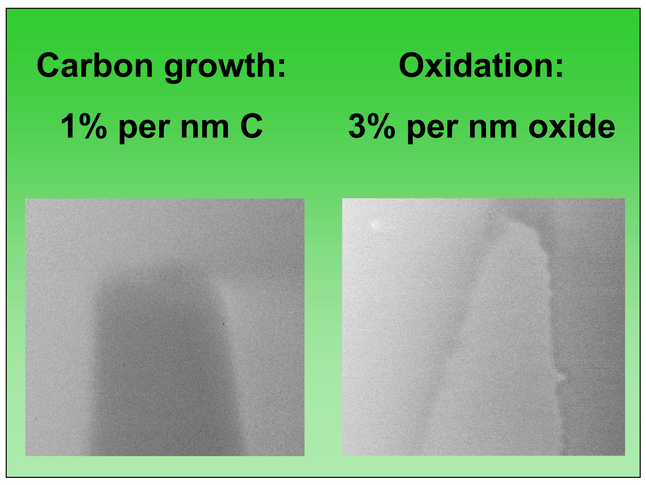
- EUV mirrors show carbon growth / oxidation under EUV radiation
- Throughput lifetime spec is R/R < 1%
- Lifetime requirement is > 30000 h

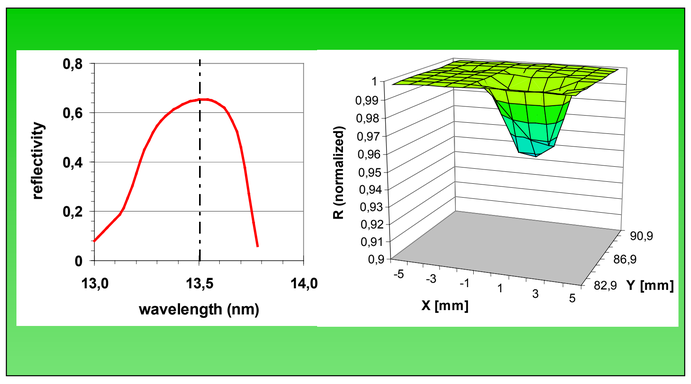
### Current Strategy

- Protect Multilayer with Cap layer from oxidation
- Remove Carbon layer with cleaning process

**Carbon growth:** 1% per nm C

**Oxidation:** 3% per nm oxide






ML development and sample preparation — FOM

Coater, X-ray diffraction

Surface analysis — PHILIPS

SEM, AES, SIMS, XPS

ZEISS

ASML

EUV contamination tests and reflectivity — PTB

reflectometry contamination beamline

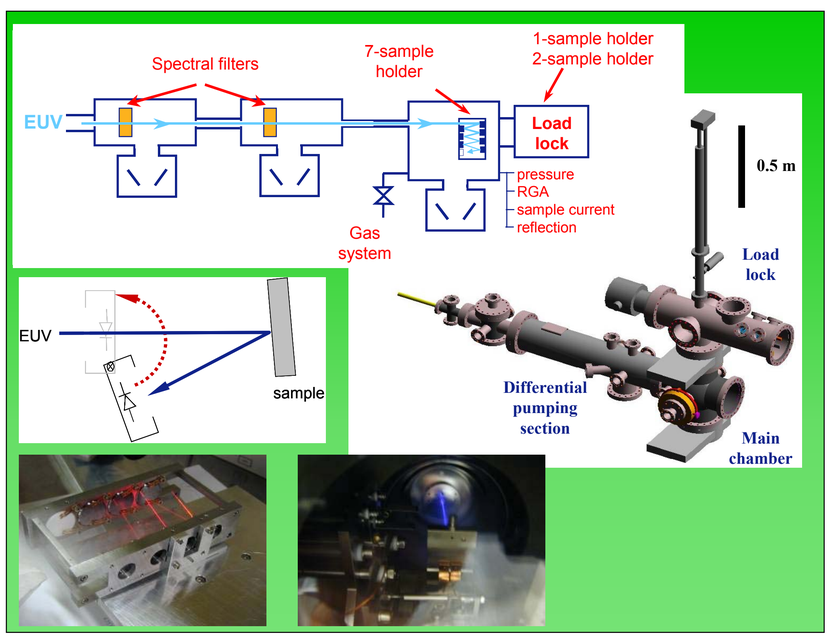
ASML — Pulsed EUV contamination experiments (see poster #4)

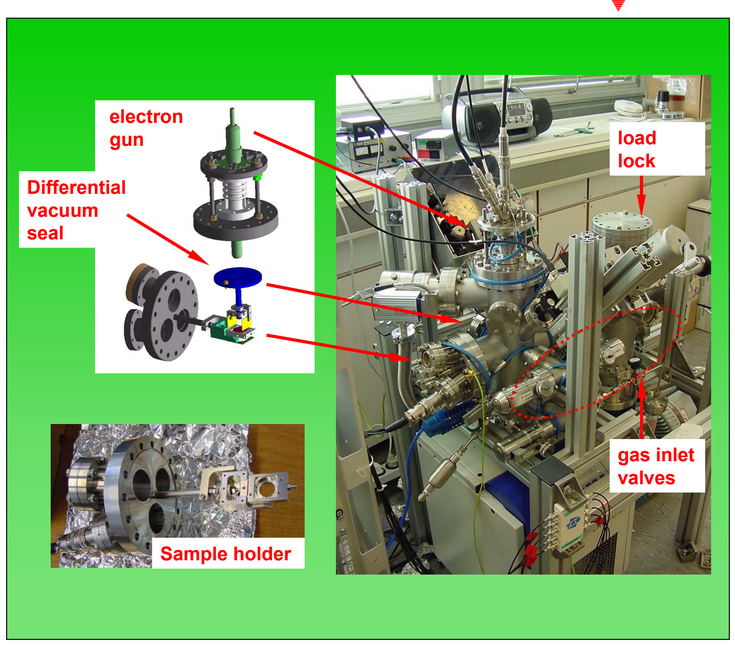
Xe discharge source (HCT)

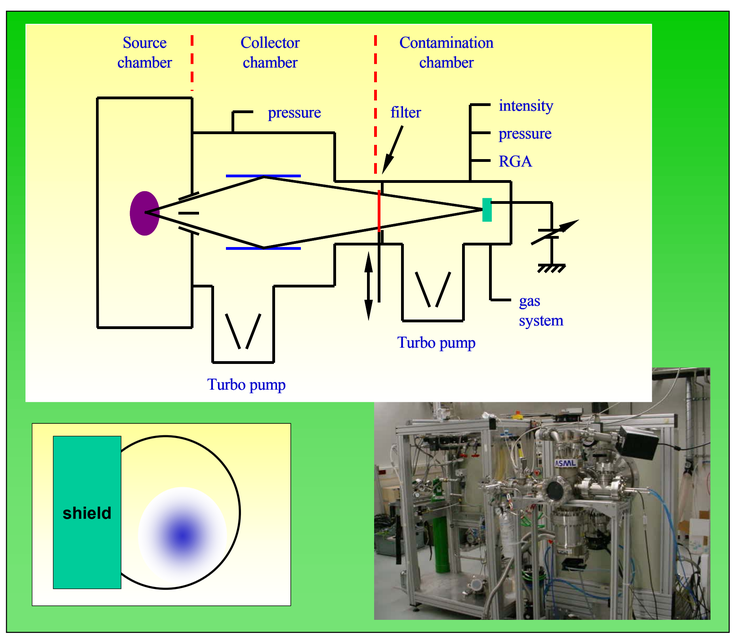
Coordination, electron experiments and data interpretation — TNO

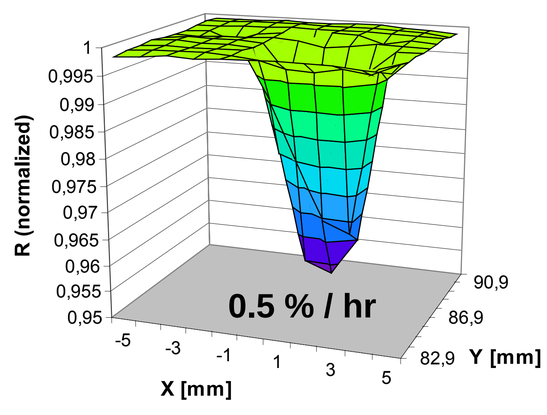
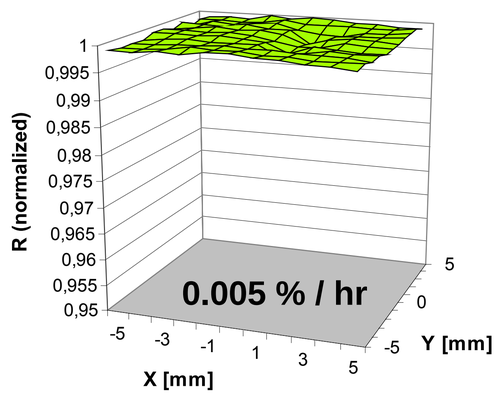
Electron gun contamination set-up

Robot sample handling




## Conclusions:

- **HW facilities in place to develop mirror contamination and life time strategies**
- **Progress sofar: -0.5%/h -> -0.005 %/h even for high load mirrors**