

## **EUV induced secondary electron emission on HfO<sub>2</sub>, SnO<sub>2</sub>, and Ru thin films**

Feng LIU<sup>1</sup>, Marko STURM<sup>1</sup>, Erik DARLATT<sup>2</sup>, Michael KOLBE<sup>2</sup>, Chris LEE<sup>1</sup>, Fred BIJKERK<sup>1</sup>

*1. XUV Optics, MESA+ Institute for Nanotechnology, University of Twente Enschede, The Netherlands*

*2. Physikalisch-Technische Bundesanstalt (PTB), Berlin, Germany*

*e-mail: f.liu-2@utwente.nl*

EUV-induced photochemistry proceeds via two routes: direct photon-induced, and indirect secondary electron-induced processes. The relative magnitude of these is governed by the secondary electron yield (SEY) and energy spectra (SEES). The SEY of metal and metal oxide thin films were measured at the insertion device beamline (IDB) of PTB's Metrology Light Source (MLS). The SEY and SEES were measured over the wavelength range: 11-19 nm. The SEY is directly derived from the sample current. The measured SEY of Ru is in good agreement with literature. HfO<sub>2</sub> and SnO<sub>2</sub> have similar SEYs for  $\lambda > 12$  nm, which are higher than the SEY of Ru.

SEES were obtained using an electron analyzer. Both biased and unbiased samples show that the majority of the SEs have an energy lower than 15 eV. All three materials have SEES maxima that lie within 1 eV of each other.

The combined results of SEY and SEES will provide insights into EUV-induced surface chemistry by clarifying the role of the EUV photons and SE induced processes.