

VA 2: Vacuum Physics

Time: Monday 10:30–11:45

Location: H25

Invited Talk

VA 2.1 Mon 10:30 H25

Novel routes in vacuum metrology at PTB and beyond —
 ●STEPHAN PUTZKE and KARL JOUSTEN — Physikalisch-Technische
 Bundesanstalt, Institut Berlin

At PTB, we have recently investigated and setup new standards for vacuum pressure calibrations which shall be detailed.

There are industrial processes which demand fast changes of vacuum pressure by several orders of magnitude in 1 second or less. Using a new standard at PTB, the response of fast pressure gauges can be characterized and calibrated from normal pressure down to the mbar range in a mere 20 ms. An overview over the needed complex gas-flow simulations will be given and compared to the experiment.

Simultaneously, a new standard for measurement of outgassing rates and generation of partial pressures in the high and ultrahigh vacuum regime has been setup which allows to prepare gas mixtures of up to three gases employing the continuous expansion method. This, for example, allowed us to compare in detail the performance of four different mass spectrometers (QMS) using the exact same prepared gas samples. Details such as total pressure and pumping effects will be discussed.

Our group is also concerned with (partial) pressure measurement using optical methods with which the typical problems of QMS can potentially be avoided. This includes effects like cross-sensitivity, pumping by the QMS, and total pressure effects. One such method is laser absorption spectroscopy using optical long-path cells. In a fu-

ture project, we aim to access the total pressure in a system through the index of refraction, for which several concepts will be discussed.

VA 2.2 Mon 11:15 H25

Dynamic-XPS measurements by means of new Fast-XPS end-station based on Argus spectrometer at PETRA III —

●SERGEY BABENKOV¹, VICTOR ARISTOV^{1,2,3}, OLGA MOLODTSOVA^{1,4}, FRANK SCHOLZ¹, JOERN SELTMANN¹, IVAN SHEVCHUK¹, LEIF GLASER¹, and JENS VIEFHAUS¹ — ¹DESY, Hamburg, Germany — ²ISSP RAS, Chernogolovka, Russia — ³TU Bergakademie, Freiberg, Germany — ⁴ITMO, Saint Petersburg, Russia

The experimental setup, based on a hemispherical electron spectrometer Argus (Omicron NanoTechnology GmbH), has been built up, commissioned and currently is available for regular users of PETRA III. The setup allows acquiring both traditional scanning and extremely fast snapshot (down to 0.1 sec/spectrum) XPS spectra of several core levels (CL). It opens new possibilities to real time characterization of the fast processes from quantitative and qualitative point of view by dynamical measuring of XPS. The concept was verified by real time XPS characterization of thermally induced process of graphene formation on model cubic-SiC(001)/Si(001) wafer. Moreover, we present the dynamic-XPS study of controllable metal-organic interface formation (Indium/CuPcF₄) at room temperature conditions. This work was supported by grants of RFBR No 13-02-00818, 14-02-00949, BMBF-Project No. 05K12GU2, PSP-Element No. U4606BMB1211.