SIMS Applications

from Tomography to Real Time Monitoring of Catalytic Reactions

Petr Bábor[1,2]

[1] *Institute of Physical Engineering, Faculty of Mechanical Engineering, Brno University of Technology*

[2] *CEITEC - Central European Institute of Technology, Brno University of Technology*

This talk will briefly introduce Secondary Ion Mass Spectrometry (SIMS), which has a wide range of applications. In addition to standard applications such as depth profiling of semiconductors including quantitative analysis of dopants, the possibilities of analysis in tomographic mode in combination with X-ray tomography and other methods (SEM and EDS) will be presented (Fig. 1). Tomographic measurements will be presented on samples from the semiconductor industry. In addition, 2D SIMS analyses of the platinum surface during the catalytic oxidation of CO to CO_2 in real time will be discussed (Fig. 2).

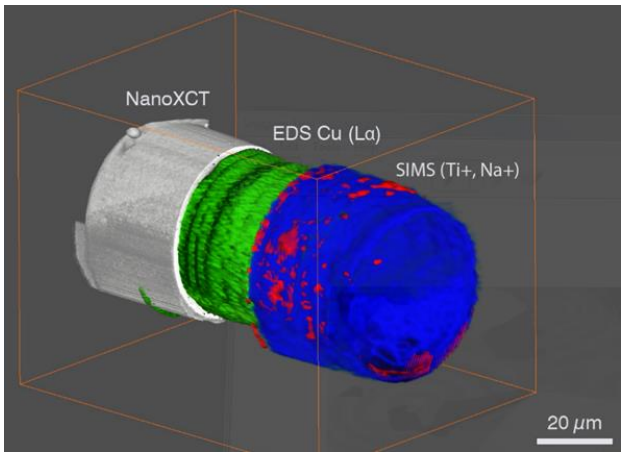

Fig. 1 Correlative 3D model of through-silicon via reconstructed using tomographic data from NanoXCT, FIB-SEM (EDS), and FIB-SIMS.

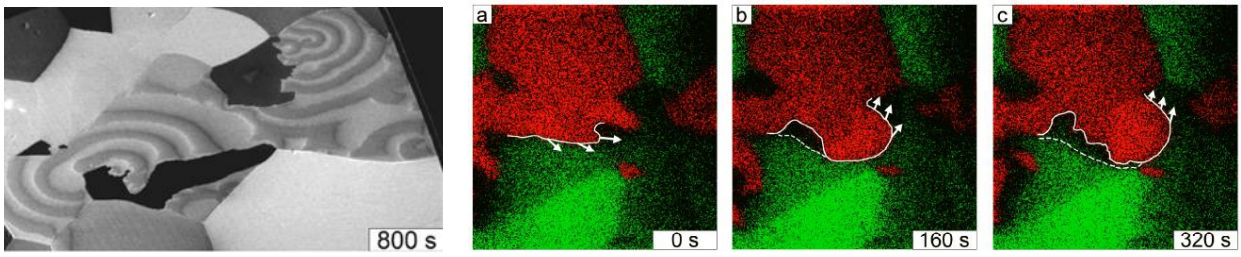

Fig. 2 Temporal evolution of rotating spirals on Pt(4,1,10) surface at T = 170 °C observed by UHV-SEM TESCAN on the left. Bright areas are covered by CO; dark areas are covered by oxygen. a), b), and c) Temporal evolution of patterns observed on the same Pt(4,1,10) grain measured by TOF-SIMS5 IONTOF. A full white line highlights the moving wavefront; white arrows indicate the direction in which the wave proceeds between frames; a dashed white line delimits the area without chemisorbed reactants. Red color shows PtO_2 covered surface and green means CO covered surface.