Book of Tutorials and Abstracts

European Microbeam Analysis Society

EMAS 2024

14th

REGIONAL WORKSHOP

on

THE EDGE OF NEW EM AND MICROANALYSIS TECHNOLOGY

12 to 15 May 2024
at the
Brno University of Technology, Brno, Czech Republic

Organised in collaboration with:
Brno University of Technology (VUT)
Central European Institute of Technology (CEITEC)

EMAS
European Microbeam Analysis Society eV
www.microbeamanalysis.eu/

This volume is published by:
European Microbeam Analysis Society eV (EMAS)
EMAS Secretariat
c/o Eidgenössische Technische Hochschule, Institut für Geochemie und Petrologie
Clausiusstrasse 25
8092 Zürich
Switzerland

ISBN 978 90 8227 6978
NUR code: 971 – Materials Science

MULTI BEAM SEM (MSEM): EXTREME LARGE 2D AND 3D NANOSCALE APPLICATION

Antonio Casares

Carl Zeiss Microscopy
Carl Zeiss Strasse 22, 73447 Oberkochen, Germany
e-mail: antonio.casares@zeiss.com

Antonio Casares is sales and applications specialist at ZEISS Research Microscopy Solutions in Germany. He has more than 25 years of experience in the design of mass spectrometers and electron microscopes and a deep application knowledge in those techniques. Antonio holds an MSc in biophysics from the University of Giessen (Germany), where he also earned his PhD in "Charged Particle Optics", followed by post-doctoral work at the Max Planck Institute in Germany and the Oak Ridge National Laboratory in the U.S.A., before he joined ZEISS Microscopy in 2002.

1. ABSTRACT

Modern microscopy labs are typically outfitted with a suite of instruments, capable of capturing data across a range of length scales in 2D and 3D, from the centimetres to the sub-nanometres. These imaging instruments are often complimented by analytical techniques, such as spectroscopic chemical characterisation platforms or mass spectrometry and are designed to produce a comprehensive depiction of the material under investigation.

Recently, a novel multi-beam SEM (MSEM) technology for imaging of large sample areas has been developed by ZEISS. The MultiSEM family features 61 or even 91 electron beams scanning in parallel, resulting in an imaging throughput of up to 2 TeraPixels per hour [1] is now achievable, therefore, enabling extremely large-scale imaging experiments in 2D and 3D.

Here, we present a unique advancement enabling correlative microscopy, which uses a centralised software platform to pull together data from light-, electron-, ion-, and X-ray microscopy (XRM). Beyond just correlating the various datasets, the approach allows data from one technique to be used to drive the hardware in another technique, facilitating easy transfer of information between the suite of available microscopes and the operator.

The presentation will give an overview of the current state of the technology, its potential application space and the challenges in data handling imposed by the enormously increased data rate.

REFERENCES

[1] Crosby K, Eberle A L and Zeidler D 2016 *MRS Advances* **1** 1915-1920