

PORTABLE SCANNING AND ACQUISITION SYSTEM FOR MINIATURE SEM

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ABSTRACT

This paper presents a device that constitutes a nearly complete control and measurement system intended for conducting research on a miniature scanning microscope (μ SEM)[1]. The subject of the publication is also sample data recorded using this equipment - images of samples and results of linear analysis.

The described system (fig. 1) consists of an octupole deflector controller, a detected signal preamplifier and a data acquisition system. The input and output circuits are isolated (floating), which allows working with μ SEM structures of any configuration (detector or cathode at ground potential). A diagram of an example μ SEM setup is shown in fig. 2.

The control software (fig. 3) allows you to work in three modes: line scan, raster scan and detector test mode. The deflection parameters are set separately in each mode via text input or graphical interface. The data is saved in CSV files from which entire images can be restored and further processed with another specialized program, or data can be processed in any other way. An example of a calibration grid image obtained with this system is shown in fig. 4. An SE detector in the form of a silicon plate biased with a voltage of +30V relative to the sample was used to record it.



Fig. 1. Portable micro SEM control unit

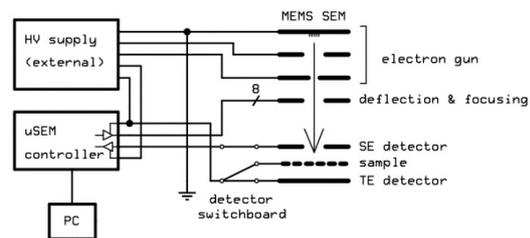


Fig. 2. Diagram of micro SEM structure made with MEMS technology

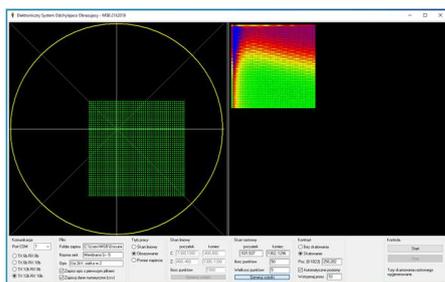


Fig. 3. Control software

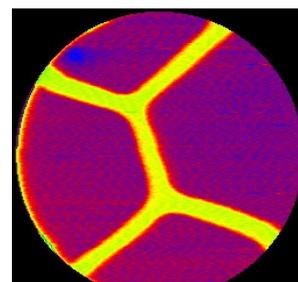


Fig. 4. Image of 30 μ m wide, hexagonal calibration grid wires

References

- [1] Michał Krysztof, Marcin S. Białas, Piotr Szyszka, Tomasz P. Grzebyk, Anna Górecka-Drzazga, "Fabrication and characterization of a miniaturized octupole deflection system for the MEMS electron microscope", Ultramicroscopy, 2021, vol. 225, art. 113288, p. 1-8

C:Vacuum Microelectronic and Nanoelectronic Devices

A2:Vacuum-Microelectronics and Vacuum-Nanoelectronics Technologies

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