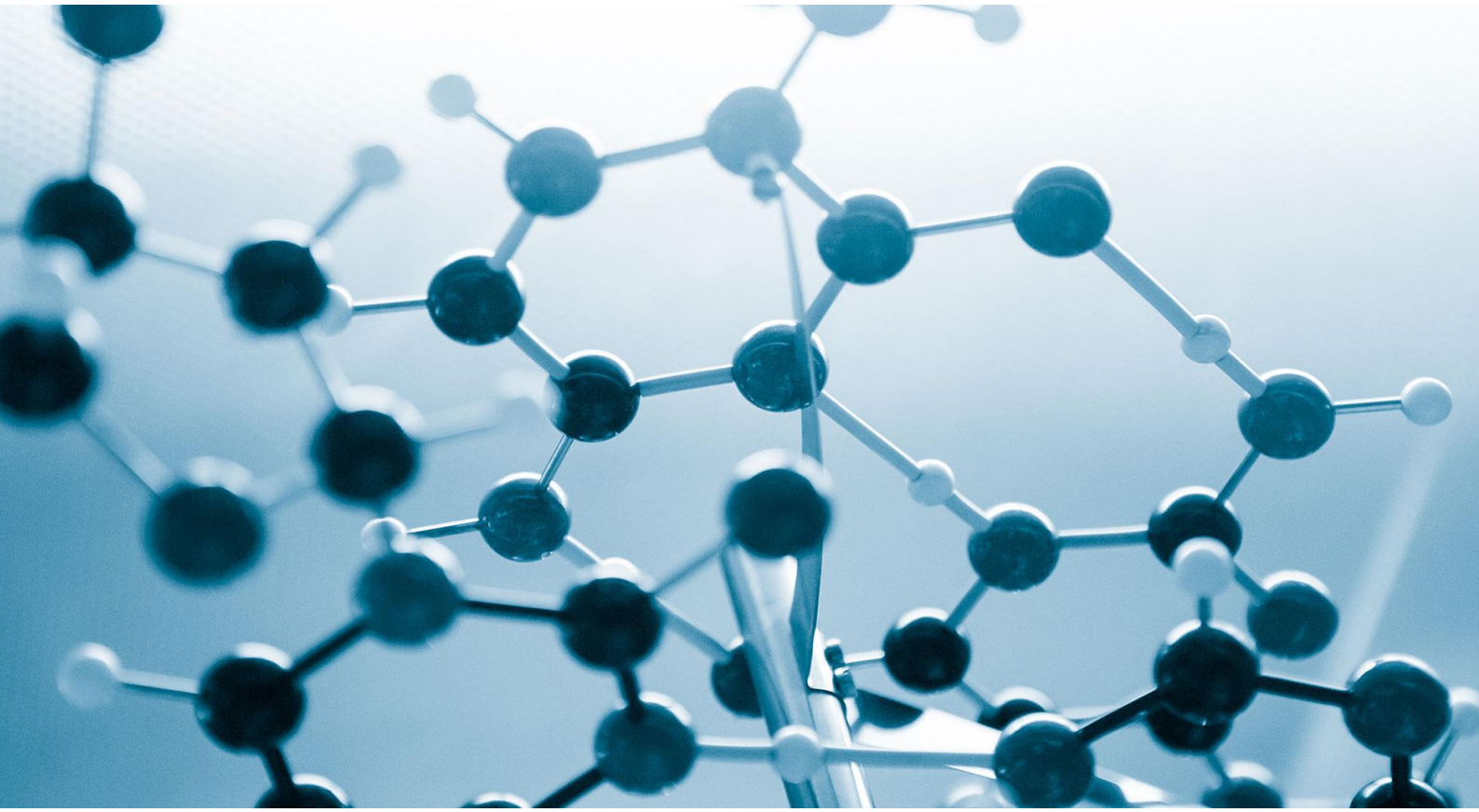

Research and Development Laboratory Nanores

An offer dedicated to

Modification of integrated circuits

Nanores Sp. z o.o. Sp.k.
Bierutowska 57-59, Budynek 17
51-317 Wrocław, Polska

NIP [Tax ID No.]: 8982212066
REGON [Company Reg. No.]: 361709380

phone nr: +48 698 777 928
email: info@nanores.pl
www: www.nanores.pl

ABOUT NANORES

Nanores is a hi-tech, independent research and development laboratory, set to provide the highest quality service and improve standards of cooperation between science and business. Through the use of state of the art equipment and by creating a team of specialists in various fields (physics, mathematics, chemistry, materials science), we are able to efficiently identify needs and provide the best solutions for our partners.

We are specialized in analysis and modification of structure of hard materials, both conductive and non-conductive. Our laboratory is equipped with electron and ion Dual Beam microscopes (SEM/PFIB, SEM/FIB), and Atomic Forces Microscope (AFM) with multiple advanced 2d and 3d imaging modalities. We offer unique ability of surface and volume imaging and analysis in nanometric scale including the identification of the atomic composition. Beforementioned services allow to reveal manufacturing micro and nano defects along with verification of their causes, supporting production optimization processes. We provide services for the production and design of micro and nano prototypes of photonic, mechanical, electronic and other structures.

OUR EQUIPMENT

1. DualBeam SEM/Xe-PFIB system (1st in Poland, 2nd in Europe) FEI Helios PFIB
2. DualBeam SEM/Ga-FIB system FEI Helios NanoLab 600i
3. AFM Nanosurf FLEX Axiom
4. EDS detector Bruker XFlash 630 mini
5. High vacuum coater Quorum Technologies Q150T E
6. Plasma Cleaner PDC-32G-2

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OUR OFFER

We introduce possibilities associated with modification of integrated circuits. This offer presents an exemplary scenario of such operation.

We assume examination of an electric device containing a microchip in which certain modification must be carried out without exposing it to solar radiation. In first step we analyse structure of the integrated circuit using computed microtomography (Fig. 1 µCT analysis of integrated circuit's structureFig. 1).

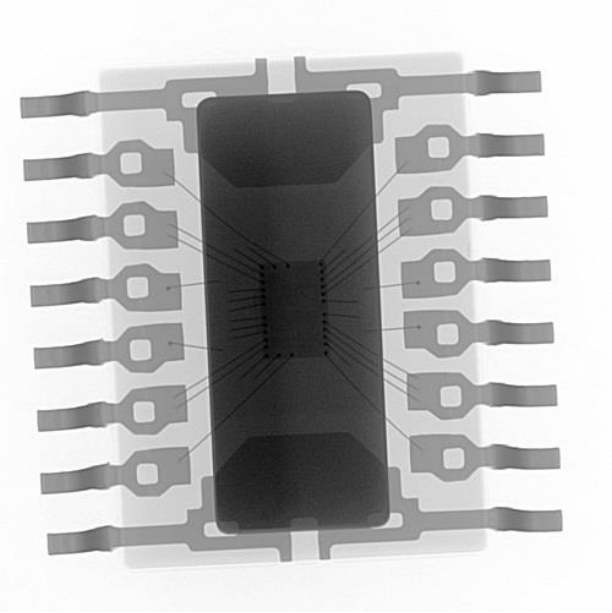

Fig. 1 µCT analysis of integrated circuit's structure

After determining the position of examination it is necessary to mechanically remove excess of outermost case layer. If the microchip is insensitive to the light the case remaining must be removed too to unveil silicon structure. After such preparation the device is transferred to DualBeam microscope for selective material removal (Fig. 2).

Fig. 2 Cross-section of integrated circuit made using Xe-PFIB technology

After unveiling the structure it is possible to cross signals and forwarding them to different locations in the microchip thanks to Focused Electron/Ion Beam Induced Deposition (FEBID/FIBID) technology (Fig. 3).

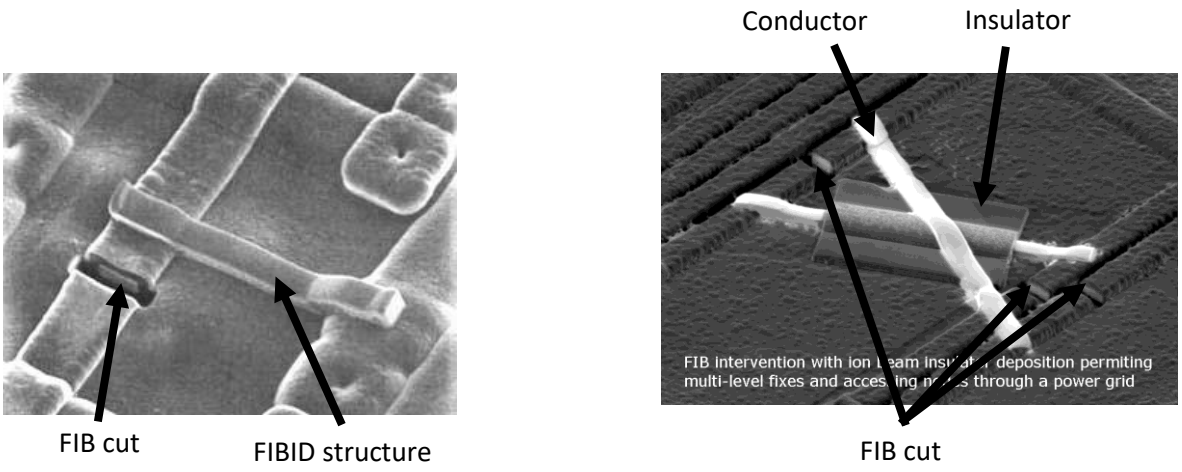

Fig. 3 Modification of integrated circuits made using DualBeam microscopy

Apart from modifying the structure of the microchip, it is possible to attach electric probes directly to the exposed parts of the device (Fig. 4).

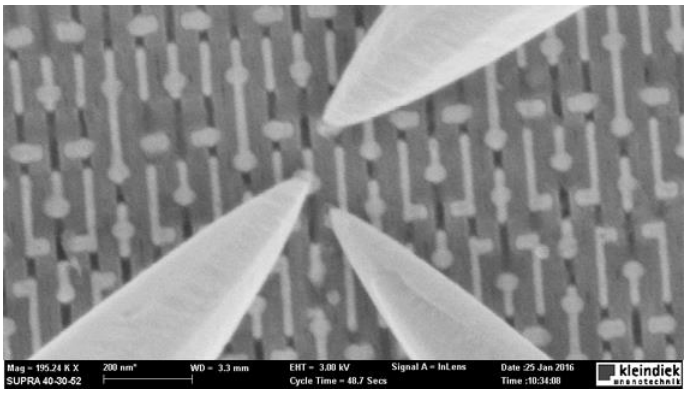

Fig. 4 Electric probes reading signals from or leading signals to the system. The edge of the probe might have a curvature below 100 nm, which guarantees precise attachment to the system.

Thank you for reading our offer. Please feel free to contact us should you have any questions.

Nanores Team

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www: www.nanores.pl

OUR PARTNERS

1. CERN, the European Organization for Nuclear Research, Geneva, Switzerland
2. Wroclaw University of Science and Technology, Wrocław, Poland
3. Labsoft, Warszawa, Poland
4. PIK Instruments, Piaseczno, Poland
5. University College London (UCL), London, Great Britain
6. uAvionics, Warsaw, Poland

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