INSTITUTE OF MICRODEVICES

Ukrainian center for micro- & nanotechnologies

imd.kpi.ua

Year	Event
October, 1962	According to the State Committee of electronics technology of the USSR (later the Ministry of Electronics Industry) it was sattled to create Engineering Department (ED-3) in Kyiv. Specialization of ED-3 – microminiaturization radar equipment.
1964	The first first hybrid circuits on thin-film technology were made. Their pilot production was initiated.
1965–1967	The first developmental work related to creation of the equipment based on hybrid circuits was done.
1964–1965	Additional land use planning and management that was give to Engineering Department (Kyiv, Nyvky) was started with the construction of a new buildings for R&D purposes.
1965	The first samples of MOS transistors were produced by Engineering Department.
1966	A new laboratory was placed in operation (Kyiv, Nyvky).
1966	According to the order of the Minister of Electronics Industry, the main field of the Engineering Department was set as a development of field effect transistors and integrated circuits based on MOS structures including development of integrated circuits in MOS structure for linear technology;
September 1966	Engineering Department was reorganized to Kyiv Scientific Research Institute (SRI) with manufacture facility.
1967	At SRI the division for integrated circuits manufacturing based on planar technology was created
1969	The construction of three bulks for pilot plant and administrative bulk was launched.
1970	Three bulks were bring into service.
1967–1970	At SRI the first MOS integrated circuits for computer engineering were developed.
The beginning of 70th	The first developmental work based on planar-epitaxial technology for integrated circuits of operating amplifier, analog signal multiplier, integrated circuits for consumer electronics, naked chips for operating amplifier were made.
1970	On the pilot plant of SRI the manufacturing of MOS integrated circuits was started.
1970	The research, development and production facility «Crystal» was created. Kyiv SRI of microdevices – the main enterprise of Alliance. Research Enterprise of SRI is a part of this Alliance as an independent Enterprise. On his and «Kvazar» manufactory base production facility for manufacturing of bipolar and MOS integrated circuits was created.
1971–1972	The first series of MOS LSI for electronic computers and control systems.
1972	At research and manufacturing association «Crystal» the manufacturing of MOS LSI and microcalculators on their base was started. The first LSI (K145 series) were develped and first national microcalculator «Electronica 4-71B» was created. Multiseries manufacturing of MOS integrated circuits for electronic computers and control systems was started.

Year	Event
1973	On the base of two Departments (developments of measuring equipment), three construction departments (development of unusual special process equipment) and research-and-development division, the mechanical facility was created. The first type of LSI for one crystall pocket-sized calculator was developed. The first MOS LSI charge coupled device (channel capacity 4 Kbit) and programmable read-only memory (channel 1 Kbit) were developed.
70th	The Kyiv SRI of microdevices becomes an associate contractor of complex grant programmes for creation of LSI for memory applications, microprocessors, operational amplifiers for Ministry of Electronic Industry.
1974	The research and manufacturing association «Crystal» («Kvazar» enterprise – development of LSI, «Calculator» manufacture in Svitlovodsk - manufacture of calculators) the manufacturing of pocket-sized calculators for different purposes was started.
1975	The technology for p-channel MOS LSI with polysilicon gate was developed.
1975–1976	The first series of solid-state microcircuit of operational and differential amplifiers was developed.
1975	Kiev research and manufacturing association «Crystal» was transformed to production and technical union «Crystal» with the main organization «Kvazar». Kyiv SRI without pilot plant is a part of it.
1977	Kiev research and manufacturing association «Crystal» was transformed to manufacture organisation.
1977	The first LSI MSOS reprogramable read-only memory with electric recirculation were developed.
1977	The n-channel MOS LSI technology was developed.
1976–1978	The first LSI with 8 bit microprocessor chip set was developed. The mass production was implemented at «Kvazar».
1978	The first LSI of nonvolatile reprogramable read-only memory with UV data cancellation (capacity 2 Kbit) were developed. The Ministry of Electronics Industry accept a decision about the formation at Kyiv SRI of industry expertise for physical-chemical research and highly-accurate measurements.
1978-1980	The Kyiv SRI switch its organisational structure to scientific-research type.
The end of 70th – beginning of 80th.	The technology for manufacturing of integrated circuits on the base of electron and hole conduction silicon dielectric insulation structures was developed.
1980–1982	The 16-bit one chip microprocessor was developed.
1982	THe first MOS LSI reprogramable read-only memory with electric recirculation were developed. .
1983–1985	The basic version of micro computer «Electronica K1-10» was developed.
1985–1986	The first MOS LSI of single crystall micro computer was developed. The personal microcomputer «Electronica MC1502» was developed and its manufacturing production was started at «Kontinent» (Zelenodolsk) was started.
1976–1988	Creation and development of MOS LSI automated computerized design was started at SRI.

Year	Event
1978–1982	SRI developed and started manufacturing production of: • Basic 8bit microprocessor chip set (7LSI) in plastic casing for dedicated uses; • LSI programmable read-only memory with capacitance 16, 64, 128 Kbit, 16 Kbit programmable read-only memory for dedicated uses; • LSI of nonvolatile reprogramable read-only memory with informative capacitance 4, 16 Kbit for general purpose industrial grade and dedicated uses; • Intgrated circuits of operating amplifier and analog multiplier of signals (140УД12, 140УД14, 140УД20, 1408УД1, 525ПС1, 525ПС2; • Integrated circuits for analog delay lines, dynamic filter, and autocorrelation filter on the base of charge coupled devices; • Integrated circuits for multiplexer, package in particularly and on the base of Si on sapphire structures; • Integrated circuits for stereo tape-recorder (9 types); • LSI for microcalculators for different purposes and micro computers: Electronica Б3-14К; Б3-32; Б3-34; МК-43; МК- 46; МК-47; МК-48; МК-54; • Micro computer «Electronica К1-10», «Electronica К1-20» and micro computer for specific use in medical cardiometry «Electronica К1-КМ»; • Developed and implemented industrial technology for manufacturing of integrated circuits on the base of electron and hole conduction silicon dielectric insulation structures and additionally new technological structures: • SiN, polysilicon films deposition in low preassure reactors; • Plasma-chimichal etching, microcircuit pakaging without jacket on the base of flexible carrier/substrates; microscheme pakaging with using of ultrafine medium.
1983–1987	SRI developed and started manufacturing production of: • Basic 16-bit microprocessor chip set and co-processors (К1810); • Family of 8-bit single-crystal micro computers, based on CMOS-technology in particularly; • LSI-controllers direct memory access (DMA) and floppy disk drive (FDD); • LSI reprogramable read-only memory with UV data cancellation (data capacity 16, 64, 256 Kbit); • LSI nonvolatile reprogramable read-only memory with electric data cancellation (data capacity 4, 16, 64 Kbit); • Numerous of new integrated circuits (radiation resistant, analog signals multiplier, integrated circuits analog delay lines, dynamic filter, and autocorrelation filter on the base of charge coupled devices); • Numerous of integrated circuits for high quality magnetic recording; • technology for manufacturing of MOS LSI n-channel MOS-transistors with proportional scalling elements sizes; • Technology for manufacturing of MOS LSI on n-channel MOS-transistors with floating gate; • mixed technology of analogue VLSI (complementarybipolar transistors, p-channel MOS-transistors, precision polar transistors);

Year	Event
1983–1987	• multipurpose technology of analogue VLSI, that contain different blocks on one crystall (complementarybipolar transistors, p-channel MOS-transistors); • CMOS-technology with n-bag and polysilicon gate for digital and analog VLSI; • Construction and pakaging technology for LSI, microelectronic devices based on flexible carrier.
Second half of 80th	On the base of «Kvazar» Alliance, its departments and divisions – research and manufacturing complexes for (1) photolithographic mask formation, (2) Microprocessor development», Memory applications, Operational amplifiers.
The end of 80th	On the base of department #400 and divisions #3 and #10 of «Kvazar», the research and manufacturing complex for development and manufacturing of integrated circuits for precision operational amplifiers was created.
1988	«Kvazar» together with SRI started manufacturing of integrated circuits for operational amplifiers on the base of silicon structures with dielectric isolation and electron and hole conduction silicon dielectric insulation structures.
Second half of 80th.	The work on creation of MOS-VLSI programmable read-only memory for 1 Kbit and 32-bit microprocessor.
The end of 80th	The three among 4 CMOS VLSI for 32-bit microprocessor for MARS-T system with transputer architecture.
1988	The new research and manufacturing association Microprocessor was created. To this association manufacturing complexes «Crystal», «Gamma», «Graviton», concern «Rodon», enterprise «Prometey» were incorporated. They was the main manufacturers of microelectronic products in Ukraine. SRI of microdevices was incorporated to manufacturing complex «Crystal».
1992	The research and manufacturing association Microprocessor was eliminated as an organisational set-up. Kyiv SRI of microdevices became an independent enterprise with attachments to the Ministry of engineering and conversion of the military-industrial complex of Ukraine. After reorganisation of this Ministry – to The Ministry of Industrial Policy of Ukraine.
2004	Kyiv SRI was withdrawn from the jurisdiction of The Ministry of Industrial Policy of Ukraine and as an State Enterprise SRI of Microdevices was included to the National Academy of Science of Ukraine from the side of Scientific and Technological Corporation «Institute for Single Crystal» (According to the directives of National Academy of Science of Ukraine and The Ministry of Industrial Policy of Ukraine, №98/135, 24.03.2004)
2000	Research group of Prof. Osinsky joined IMD. On the basis of this group the Center for optoelectronics technologies (COT) was created. The assets of this team were fundamental and applied developments in technology development and optoelectronic devices fabrication based on A_3B_5 compounds. The MOCVD system was transfered from «Saturn», was installed and modernised for MOC-hydride epitaxy of III-nitrides (AlN, GaN, InN) thin films and nanostructures.
2000–2009	The COT actively develops LED technologies. Considerable research and applied technologies on hybryd and monolithical integration of high bright LEDs (including RGB white LEDs) were developed for manufacturing implementation. Numerous agreements were signed for LED matrixes implementation for traffic lighting and communal service «Kiev metropoliten» subway carriage.

Year	Event
2004–2011	Implementation of state programs and contracts. State scientific and technical programs in which SRI was involved: «The development of micro- and optoelectronic technologies in Ukraine in 2005-2007»; «The development and implementation of energy saving LED light sources and lighting systems based on them, 2009-2013»; «The development of microelectronic technology development and organization of serial production of devices and systems based on them na2008-2011 years.» Program on Scientific instrument manufacturing of Ukraine, 2009.
2010	The Directive «Creation on the base of IMD brench «Nanoelectronics technologies» of Department of Microelectronics, Faculty of Electronics NTUU «KPI»» was signed between directorates of IMD and NTU «KPI».
2011–2014	Implementation of state programs and contracts. State scientific and technical programs: «Creation of a pilot station for the production of bright white RGB LED»; «Development of scientific bases of template technology for integrated optoelectronic elements based on III-nitride materials»; «Creation and implementation into production of energy-efficient solid-state light sources»; «The development of energy-saving LEDs for subway carriages»; «Development of coordinate-sensitive detector for imaging the internal structure of objects with x-ray phase contrast system»; «Development, production and investigation of prototype for X-ray imaging formation thet can be implemented to the method of phase contrast.»
October 24 & 25, 2012	For outstanding achievements and contribution to the development of LEDs in the world, Prof. Osinskyi was invited (as a speaker) to participate in the LED 50th Anniversary Symposium, which was held at the University of Illinois, Urbana-Champaign, USA.
2014	Based on the double side order from Rector's side of NTUU «KPI» and directorates office of IMD, the Branch «Nanoelectronics technologies» was renamed to the Branch «Micro- and nanoelectornics». Additionally to the Department of Microelectronics, the Department of Physical and Biomedical electronics of NTUU «KPI» was included to the Branch.
2015	This is the year for internal reorganisation of IMD. Based on the previous research and manufacture divisions, three main Departments were formed: (1) Department of technological & analytical research; (2) Department of Nuclear-Physical and Radiation Instruments; (3) Department of Integrated Circuits. Starting from this year, IMD gradual recoving available technological and diagnostics equipment. The Directorates Offica and IMD researchers are actively engaged into the networking between IMD and foreign research laboratories, institutes and industrial companies. Participation of IMD researchers in Ukraine-Turkey research activities that was supported from TÜBİTAK 2216–RESEARCH FELLOWSHIP PROGRAMME for foreign researchers.

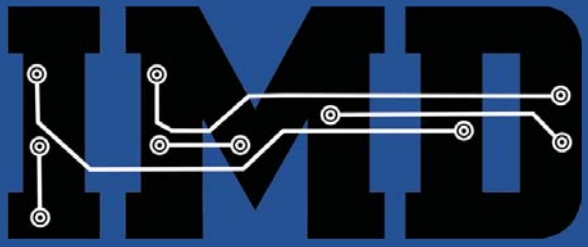
Year	Event
2016	IMD researchers have performed numerous of research related to: The influence of high-energy electrons (2 MeV) on electrical properties of MIS structures and solar cells has been studied. The analytical and experimental study of new optoelectronic device (light emitting diode) based on multicomponent solid solutions of aluminum, gallium, indium nitride (AlN, GaN, InN); Development of new methods for investigation of semiconductor structures. Investigation of the effect of long-range interaction at low energy ion irradiation of semiconductor structures on silicon. Research on the influence of low-energy ion-plasma etching of the back side silicon wafers on electro-physical properties of MIS structures Quality verification of technological processes and diagnostics equipment testing for checking the accuracy of IMD facility. Production technology of experimental structures for far IR range photodiodes Development of a coordinate-sensitive detector for diffractometry.
2016	Development of a silicon p-i-n photodetector Development of solid-state silicon linear and matrix diode detectors. Engineering & assambling development for photosensitive capsules of IP photodiodes for military purposes The development and manufacturing of microelectronic coordinate high-sensitive detectors for elemental analysis of substances (atomic concentration down to ~0.0006%). Study on development of next generation microelectronic coordinate high-sensitive detectors with high-speed and broad spectral range analysis. Development and production of devices for spectroscopy that can be used in such fields as mining, metallurgy, food, chemical, pharmaceutical sectors, nuclear energy, space research, for rocket fuel production, explosives, nanomaterials development.

INSTITUTE OF MICRODEVICES

State Enterprise Institute of Microdevices,
Ukrainian center for micro- & nanotechnologies
National Academy of Science of Ukraine
KIEV, UKRAINE 04136

tel/fax: 038-044-434-72-77

imd.kpi.ua



NATIONAL ACADEMY OF SCIENCE OF UKRAINE