www.kbsi.re.kr

KBSI

KOREA BASIC SCIENCE INSTITUTE

World-class
Research Platform

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KBSI KOREA BASIC SCIENCE INSTITUTE

Contents

World-class
Research Platform

KOREA BASIC SCIENCE INSTITUTE

Connecting
the Basic Science Infrastructures!

KBSI is the platform that connects research facilities, research equipment and researchers.

Innovating
the Basic Science Infrastructures!

KBSI is the world-class institute leading innovation of research facilities and equipment.

Beginning
the Era of Strong Nation of Science and Technology!

As an advanced platform for basic research, KBSI explores the future for science and technology through the passion and challenges to new frontier.

History

1988 ~ 1999

1988. 08.	Korea Basic Science Center (KBSC) established as an affiliate of Korea Science & Engineering Foundation
1992. 03.~ 04.	Four local Centers (Seoul, Busan, Daegu, Gwangju) established
1999. 05.	Established as a corporate body
1999. 12.	Jeonju Center established

2000 ~ 2005

2001. 01.	Name changed to Korea Basic Science Institute (KBSI)
2001. 11.	Chuncheon Center established
2005. 05.	Suncheon Center established
2005. 10.	‘National Fusion Research Institute’ established affiliated organization

2006 ~ 2015

2006. 04.	Ochang Center established
2006. 05.	Gangneung Center established
2008. 04.	Jeju Center established
2009. 08.	National Research Facilities Equipment Center (NFEC) established
2012. 12.	Western Seoul Center established

Vision & Function

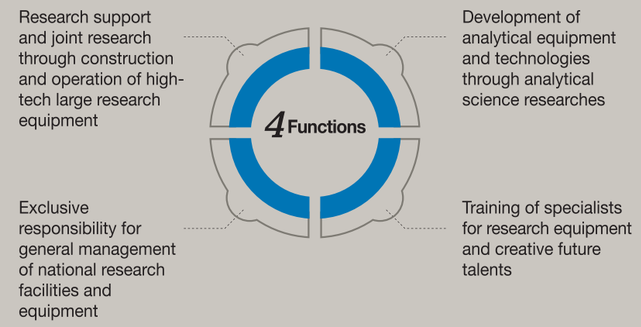
MISSION

Conduct R&D on research facilities & equipment and analytical S&T, joint research and support for basic science promotion

VISION

The world-class basic research infrastructure institute leading the innovation of research facilities and equipment

MAIN FUNCTIONS



PROMOTION STRATEGIES

Support for Advanced Analytical Research and Operation of Leading Edge Equipment

High Resolution Bio-Transmission Electron Microscope

1. Analytical Research Support

· Bioconvergence Analysis

We perform research and development, research support, and collaboration on analytical science through the bioconvergence of analytical techniques, and we pursue development of new technologies on biology field such as virus, diseases, medicines using high-tech analytical facilities and convergence technologies.

· Environmental & Material Sciences

We establish world-class infrastructures on the property of material research field, nanomaterial surface analysis field, and earth environment research filed. And we lead analysis support and project performance that can solve social problems such as next generation energy, detailed analysis of nanomaterial, measurement of living radioactivity and safety of foods.

· Scientific Instrumentation

We continuously accumulate technologies for research facilities by establishing a network of research facilities development that connects research facilities production companies and their customers such as universities and government funded research institutes related to the development of domestic research facilities. We also lead the development of domestic research facilities with the networks between industry, academy, research institute and government.

Bioconvergence Analysis

| Biological Disaster Research / Daedeok Headquarters
Design problem-solving technologies against microorganisms that cause disaster in the fields of human and animal disease industry, agriculture, and aquaculture, such as ecological analysis of microbes, analysis of viral fish disease defense mechanism, and rapid concentration and sensitive detection of foodborne pathogenic viruses
▶Representative Research Case ❶

| Drug & Disease Target Research / Daedeok Headquarters
Development of mediate research and related analytic technology that could be applied on diagnosis, treatment, and prevention of diseases such as discovering target protein related with cancers, metabolic diseases, and contaminations through proteomics analysis; determining the reason of diseases; and verifying the proof of action of new medicines through the target protein function research

| Protein Structure Research / Ochang Headquarters
Verification of diseases related protein-protein interaction mechanisms and discovery of the structure based new medicines using nuclear magnetic resonance (NMR) and X-ray diffraction method

| Bioimaging Research / Ochang Headquarters
With 7 T & 3 T human MRI, and 9.4 T & 4.7 T animal MRI, newly developed fast scan technologies and higher contrast image processing methods can apply to disease diagnosis and bio-phenomena research

| Biomedical Omics Research / Ochang Headquarters
Performance of researches for diagnosis, treatment and prediction of diseases by establishing the OMICs research platform using high-resolution mass spectrophotometer and analyzing the biomaterials that consist human body such as protein and metabolites

| Space-Time Resolved Molecular Imaging Research / Seoul Center
Establishing infrastructures of femtosecond laser spectrophotometer, super resolution optical and electro microscopes, and imaging mass spectrometer; and performance of studies on space-time distribution of molecules in bio/nanomaterial, dynamics image analysis technologies and related facilities development

| Advanced Aging Science Research / Gwangju Center
In order to obtain critical results for degenerative disease and regeneration through collaborative research in university and research institutes, we carry out the supporting of age-related research and construction of the infrastructure for utilization of an aging research cluster
▶Representative Research Case ❷

| Disease/Specific Molecular Imaging / Chuncheon Center
Convergence and research field, in which the images produced reflect cellular and molecular pathways and in vivo functional mechanisms of disease in living subjects, of suggesting a direction for early diagnosis, treatment and prevention of diseases to understand characteristics of diseases and discover new diagnostic, therapeutic and preventive strategies at the early stages for the treatment of human diseases

| Marine Biology Research / Jeju Center
Performance and supporting of high-quality researches about biomedical manufacturing technology and eco-friendly environment recovery of marine organisms via comprehensive understanding and development of marine biology

| Omics System Research / Western Seoul Center
Discovery of biomarkers for diagnosis/treatment/prevention of diseases and performance of research for verification of metabolite mechanisms and molecular network by establishing the integrated metabolites analysis platform and applying metabolite profiling technology on diseases/medicines/food/environment fields

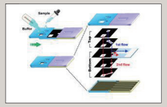
Environmental & Material Sciences

| Electron Microscopy Research / Daedeok Headquarters, Ochang Headquarters
Performance of development of nano-bio convergence image analysis technology using advanced electron microscopes; structural analysis of nano materials and three-dimentional analysis of biomaterials for the invigoration of domestic and international research support and collaborations; development of energy materials; and development of new-concept electron microscopy equipment

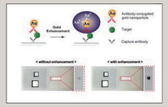
| Earth & Environmental Research / Ochang Headquarters
Preparation of world-class research facilities related to earth environment researches such as high-resolution second ion mass spectrophotometer, and performance of analysis support and convergent collaboration research for earth environment researches and solving of small and medium industries, national and social problems such as geological structure, topography, age dating of cultural properties, determination of food origin, establishment of the analysis system for national disaster reaction, analysis of environment radioactivity, etc.

| Advanced Nano-Surface Research / Daedeok Headquarters
Development of the surface and interface analysis for future electronics, environmental materials and bio fusion through in-situ nano-analytic system
▶Representative Research Case ❸

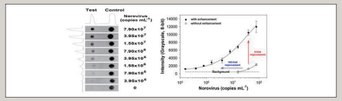
▶Representative Research Case ❶
Development of '3D paper kit' for norovirus on-the-spot detection and diagnosis
Detecting performance improved 100 times more than the previous commercial norovirus POCT kits by the creation of an innovative three-dimensional fluid paths that use cost-effective paper and a simple sliding mechanism. This platform technology can be applied to detect any other desired pathogenic viruses or biomarkers.



Contents and operating mechanism of the 3D paper chip



Catalyst property of gold nanoparticles utilized to amplify the detection sensitivity



Results of norovirus detection test

▶Representative Research Case ❷
Photoexcited porphyrins as a strong suppressor of β-Amyloid aggregation and synaptic toxicity
Photoexcited porphyrin molecules inhibit β-amyloid aggregation and rescue postsynaptic toxicity and behavioral defects in the *Drosophila* Alzheimer's disease model under blue light

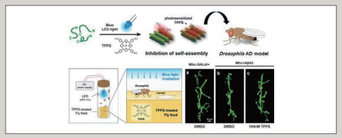
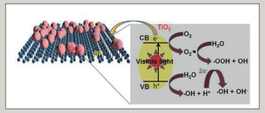


Diagram for inhibition of Aβ self-assembly into fibril ex vivo and Aβ synaptic toxicity by blue LED light-sensitized TPPS using *Drosophila* Alzheimer's disease model

▶Representative Research Case ❸
Stable semiconductor black phosphorus (BP)@titanium dioxide (TiO_2) hybrid photocatalysts
Making of black phosphorus (BP)-TiO_2 hybrid photocatalyst and solving of the unstable moisture issue of BP by replacing metal oxide particles such as TiO_2 with a simple synthesis method



Suggested schematics of photocatalytic mechanism for BP@TiO_2 hybrid photocatalyst under visible-light irradiation

| Environment Risk & Welfare Research / Seoul Center
Performance of analytical support and collaborative researches to manage hazardous materials and to cope with environmental disasters through development of analytical technology for hazardous organic/inorganic environmental substances and research on related biological/ecological effects of them

| Molecular Materials Research / Busan Center
Research for the green energy storage materials, such as improving lithium ion secondary batteries, examination of the mechanism, and modification of the present cathode/anode problems by using the surface reforming and nano-scale materials synthesis technology

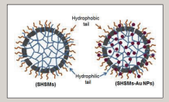
| Functional Materials Research / Daegu Center
Characteristic analysis and developments of molecular sensing materials, X-ray metrology science, and performance of initiative actions for advanced nano and molecular convergence imaging laboratory to outperform others toward advanced functional materials analysis research center

| Nano & Carbon-based Materials Research / Jeonju Center
Performance of convergence analysis and properties research on nanomaterials and carbon-based materials

| Energy Materials Research / Suncheon Center
Convergence research field of developing diverse materials that can improve the utilization efficiency of energy resources to resolve global energy and environmental issues

| Functional Interface Science / Western Seoul Center
Performance of research, analysis support and collaborative researches to improve performance and develop advanced materials through interface research of functional materials based on development of core analytic equipment/technology as well as installation/operation of high-tech research equipment for performance improvement of functional materials in energy and environment material/system fields
▶Representative Research Case ❹

▶Representative Research Case ❹
Nanocapsules for co-treatment of oil/water separation and water purification
Synthesis of silica micelles (hydrophilic core@amphiprotic shell) and their multiple applications such as oil/water separation and pollutant purification, and an ultrahigh loading capacity of enzymes with significant stability



Schematic structure of silica micelles composed with hydrophilic core@amphiprotic shell

Cover picture of Advanced Functional Materials 2015, 25(38)

Scientific Instrumentation

| Instrumentation Development Support / Daedeok Headquarters
Performance improvements and maintenance of research equipment by supporting the electronic circuit design and the machinery processing in industries, universities and research institutes

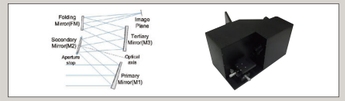
| Optical Instrumentation Development / Daedeok Headquarters
Development of core optical component equipment for research facilities and next-generation convergent microscopic system in visible light and UV/X-ray range through ultraprecision machining of aspheric optical lens under nanometer level through establishment of ultraprecision machining and measurement equipment and developments
▶Representative Research Case ❺

| Spin Engineering Physics Research / Daedeok Headquarters
Establishment of high magnetic field environment using a low temperature superconductor, high temperature superconductor and electrical conductor, and development of measurement facility for property measurement from cryogenic temperature (1.5 K) to high temperature (1000 K) resulting in the study of new material

| Mass Spectrometry and Advanced Instrumentation Research / Ochang Headquarters
Convergent research through establishment of the standard for performance evaluation of research facilities and development of high-tech mass analysis related core technologies and research facilities such as TOF-SIMS and portable mass analyzer

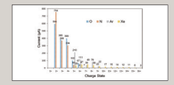
| Ion Beam Research / Busan Center
Support of material modification research fields using developed versatile ion beam research platform that can control experimental circumstance (injection depth, dose, sample temperature) and development of ion beam accelerator with ion irradiation chamber
▶Representative Research Case ❻

▶Representative Research Case ❺
Development of airborne payloads for remote sensing of coastal area
Design and development of EM model of airborne payloads specialized in domestic coastal areas that can contribute to national environment and safety by remotely observing water temperature, color change, ecosystem and disasters



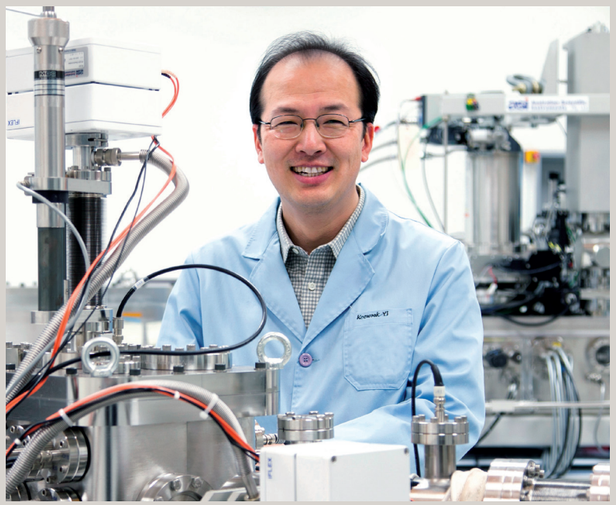
Airborne TMA fore optics for remote sensing of coastal area; Optical layout (left), Optomechanical module (right)

▶Representative Research Case ❻
Provision of ion beam services that correspond to the requirements of customers
Performance of collaboration with industry, university and institute for research on semiconductor/renewable energy/nano bio/extreme environment materials by developing and operating of ion beam accelerator



2. Development of Analytical Technologies

We develop high-end analytic technologies, which are required for solving social problems such as diseases, disasters and calamities; and global issues such as environmental contamination, energy and climate changes.



| Standardized Technology for Discriminating the Geographical Origin
Development of the integrated analysis technology and standardization system to discriminate the geographical origin of various agricultural foods distributed in Korea

| Analytical Technology in Disaster Science
Research of scientific analysis techniques to predict, prevent, and solve the natural disaster and accidents that can occasionally occur

| Bio-imaging Technology for Early Disease Diagnosis
Research on imaging of early disease progression and investigation of relationship between myocardial necrosis and successive inflammatory response for optimal treatment of Myocardial infarction (MI)

| Culture Property Preservation and Analysis Technology
Provision of scientific information about origin, mobility and culture exchange of the archeoanthropine through isotope and age-dating research on archaeological relics and archeoanthropine

| Analytical Techniques using Biochemical Forensic Biomarkers
Development of scene-applicable analytical techniques using biochemical forensic biomarkers for fast, accurate and portable crime scene investigation

3. Operation of Leading Edge Equipment

KBSI develops cutting-edge analytical technology to extend capability of analytical services and develops high-tech research equipment and related elementary technology to secure national competitiveness.

❶ | High Voltage Electron Microscope, *HVEM*
Atomic structure analysis of nanostructured materials

❷ | 15 T Fourier Transform Ion Cyclotron Resonance Mass Spectrometer, *15 T FT-ICR MS*
Discovery of biomedicine, determination of crude oil price with components analysis

❸ | High Field-Nuclear Magnetic Resonance, *900 MHz Cryogenic NMR*
Structural analysis of body proteins and research of new medicines

❹ | High Resolution-Secondary Ion Mass Spectrometer, *HR-SIMS (SHRIMP)*
Age dating of rocks creation, analysis of radioactive nuclides

❺ | Multi Disciplinary in-situ Analytical System
In-situ analysis of nanomaterial properties and new materials

❻ | Nano-Secondary Ion Mass Spectrometer, *Nano-SIMS*
Imaging analysis of trace elements in high-tech materials

❼ | Femtosecond Multi-Dimensional Laser Spectroscopic System
Femtosecond level observation of dynamic structural change of molecules in real time

❽ | Bio-High Voltage Electron Microscope, *Bio-HVEM*
Research on the three dimensional structure and dynamics of biomaterials at molecular level

❾ | 7 T Human MRI System, *7 T Human MRI*
Disease diagnosis, brain science research (brain tumor, Alzheimer, etc.)

Support for Research Equipment Industrial Ecosystem

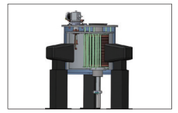
Domestic research equipment performance evaluation and utilization lab

KBSI performs a role as a leading institute of promotion of research equipment industry through development of high-tech research instruments and core technologies, and through securement of instrument's reliability.

| Development of High-Tech Equipment

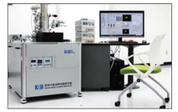
Remodeling and development of analysis equipment (complete products or key parts) and auxiliary systems through core technology development that meets the demands of cutting-edge research

- **Cryogen-Free NMR System Using High-Temperature Superconducting Magnet**
  Development of a High-resolution Nuclear Magnetic Resonance (NMR) Spectrometer that elucidates the structure and motion of molecules by using the second-generation high-temperature superconducting magnet without the use of expensive liquid helium
- **Low End Transmission Electron Microscope**
  Development of a Low End Transmission Electron Microscope (TEM) that allows novice users to easily analyzes the characteristics of functional nanomaterial properties and the structure of bio-specimen without staining process for the first time in Korea
- **Ion Beam SIMS System**
  Development of gas cluster ion beam and liquid metal ion beam to construct a TOF-SIMS (Time-of-Flight Secondary Ion Mass Spectrometry) that allows for analysis of bio samples and surface of materials



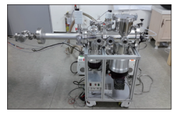
400 MHz NMR Magnet with 2nd-Generation Superconducting Tapes Wound and NMR Probe

External (left) and internal views of 2-Channel NMR Probe (right)



1st testbed for development of key elemental technologies & devices of low-end TEM

Testbed's operation platform & electron beam image acquired by optical CCD



Gas Cluster Ion Beam

Liquid Metal Ion Source

| Education of Expert Technique for Equipment Maintenance

- Designing and performance of education program with expert technique on equipment maintenance based on the know-how of research equipment operation and management in KBSI
- Provision of training for the improvement of efficiency of research equipment such as maintenance of the best performance and life extension

Education of expert techniques of equipment maintenance

| Evaluation of Performance of Domestic Research Equipment and Application Support

- Contributing to the promotion and support of domestic research equipment industry with the increased reliability of instruments through comparison/evaluation/diagnosis/improvement of domestic equipment by preparing the standard for the evaluation of domestic equipment performance and establishing/operating the domestic equipment application lab
- Supporting quality enhancement through the verification of superiority of research equipment and performance improvement through user-based tests on domestic analytic equipment

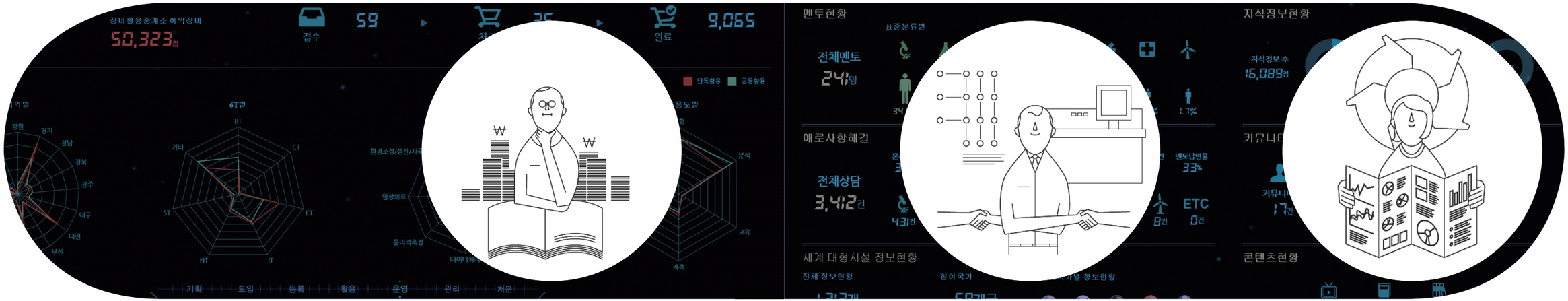
Establishment of 'Domestic research equipment performance evaluation and utilization lab' to evaluate performance between domestic and foreign equipment (Open-lab system)

National Management of Research Facility and Equipment

National Research Facilities & Equipment Center

NFEC, *National Research Facilities & Equipment Center*

NFEC provides systematic support for promoting national science and technology by managing national research facilities and equipment.
NFEC contributes to more effective investment of the research facilities and systems, expanding user facilities, providing educational and training programs in analytical science.
We aim to build the advanced R&D infrastructure through the strategic investment and effective management system.
http://www.nfec.go.kr



"Korea with powerful infrastructure of science and technology!

***National Research Facilities & Equipment Center** leads."*

| Strategic Investment

01 Execution of the Pre-Feasibility Studies on the facilities and equipment required for large-scale R&D programs

02 Preparation of a system to deliberate feasibility studies for construction of research facilities and equipment, and operation of a deliberation committee

03 Building a road map based on national demand prediction for the strategic construction of large-scale research facilities

04 Investigation and analysis on the investment and utilization of research facilities and equipment

| Promotion of Co-Utilization

05 Services to promote the co-utilization of research equipment and to provide various contents about research equipment

06 Call center service where we consult to the users about operation, utilization, recycling of research facilities and equipment

07 Browsing service of the information on the worldwide large-scale research facilities

08 Awarding to the honorable people contributed to the co-utilization of research facilities and equipment

| Overall Operational Management

09 Online service for the national management of the information on research facilities and equipment

10 Preparation of standard guidelines for lifecycle management of research facilities and equipment

11 Provision of education program on the ethical use of equipment, standard guidelines for the usage of equipment

12 Performance of a nation-wide investigation to check the implementation status of following the standard guidelines in the equipment operation

13 Promotion of the recycle of equipment by supporting the transfer the equipment from the old users to the new users

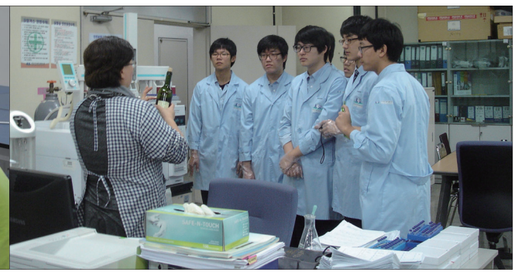
14 Operation of an electronic library that offers various reports on research facilities and equipment

Training of Analytical Science Researchers

1. KBSI's Outreach Program

KBSI's education and outreach programs, “X-Science” and “Junior Doctor” strive to “inspire and motivate students to pursue careers in science and technology” and to “engage the public in sharing the experience of exploration and experiment” by utilizing R&D resources.

Junior Doctor

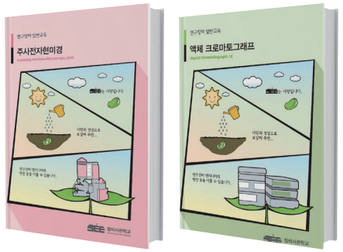


X-Science

2. Education Program for Research Equipment Engineer

As the only education program for research equipment engineer in Korea, we contribute to improving the utilization of research equipment and career development in scientific technology field by training research equipment experts who can operate and manage research equipment in basic scientific area, and analyze data through 1 year of the intensive education course focusing on field training. We selected professional education institutes in metropolitan areas around the country, and we annually and systematically perform the theoretical and practical education for core research equipment for customers(trainees) of each region.

Education Program for Research Equipment Engineer



Textbooks for the Programs

3. Graduate School of Analytical Science and Technology

Graduate School of Analytical Science and Technology (GRAST) was jointly established with Chungnam National University (CNU) as a new university-institute cooperation model to combine education and S&T research. Contributing to national S&T development and securing global research competitiveness, it aims to become the world's leading graduate school in the field of analytical S&T.

Lecture and Seminar

Research and Experiment

KBSI User Facilities

Area	Equipment
Daedeok Headquarters	Ultra Precision Freeform Generator
	Micro X-Ray/UV Photoelectron Spectromicroscopy
	Micro X-ray/UV Photoelectron Spectrometer
	Expression Analysis System
	Carbohydrate Analysis System
	Amino Acid Composition Analysis System
	2-D Liquid Chromatography-Tandem Mass Spectrometer
	MoFlosTM Astrios High-Speed Cell Sorter
	LC-MS/MS Spectrometer
	SQUID-Vibrating Sample Magnetometer
	Cryogenic Probe Station
	16 T Physical Property Measurement System
	Thermophysical Properties Measurement System
	Complex AFM-RAMAN Spectroscope
	Helium Liquefier
	200 MHz Solid State Nuclear Magnetic Resonance spectrometer
	Ultra High Voltage Transmission Electron Microscope
	Field Emission Transmission Electron Microscope
	Electron Probe Micro Analyzer
	Ultra-Corrected-Energy-Filtered Transmission Electron Microscope
	Ultra High Analytical Field Emission Scanning Electron Microscope
	Focused Ion Beam
	Multi Purpose X-Ray Diffractometer
	Gas Adsorption-Desorption Measurement System
	500 MHz Solid State Nuclear Magnetic Resonance Spectrometer
	Microscopic Imaging System
	High Content Screening System
	Protein Sequencing System
	Liquid Chromatography Hybrid-FT Orbitrap Mass Spectrometer
	MALDI TOF/TOF MS System
Ochang Headquarters	MicroPET/CT/SPECT
	Multi-Angle Light Scattering
	Macromolecular X-Ray Diffractometer
	Macromolecular Automatic Crystallization System (Mosquito)
	Auto Isothermal Titration Calorimeter
	Protein Synthesizer
	CD Spectropolarimeter
	400 MHz Nuclear Magnetic Resonance Spectrometer
	500 MHz Nuclear Magnetic Resonance Spectrometer
	700 MHz Nuclear Magnetic Resonance Spectrometer
	800 MHz Nuclear Magnetic Resonance Spectrometer
	900 MHz Nuclear Magnetic Resonance Spectrometer
	7 T Human MRI System
	3 T Human MRI System

Area	Equipment
	9.4 T Animal MRI System
	4.7 T Animal MRI System
	High Resolution Mass Spectrometer
	High Resolution ESI Mass Spectrometer
	Matrix-Assisted Laser Desorption Ionization-Mass Spectrometer Imaging System
	15 T FT-ICR Mass Spectrometer System
	7 T FT-ICR Mass Spectrometer
	Triple Quadrupole Mass Spectrometer System
	Hybrid FT-ETD Mass Spectrometer
	High-Speed Q-TOF Mass Spectrometer
	Two-Dimensional Gas Chromatography/High Resolution Mass Spectrometer System
	Bio-High Voltage Electron Microscope
	Bio-Transmission Electron Microscope
	Glow Discharge Mass Spectrometer
	Inductively Coupled Plasma System
	Stable Isotope Ratio Mass Spectrometer
	Environmental Radioactivity Measurement System
	Thermal Ionization Mass Spectrometer
	Multi-Collector Static Vacuum Mass Spectrometer System
	Automated OSL Spectrometer System
	High Resolution-Secondary Ion Mass Spectrometer
	Laser Ablation-Multi Collector-Inductively Coupled Plasma Mass Spectrometer
	Matrix-Assisted Laser Desorption Ionization Mass Spectrometer System
	Elemental Analyzer
	Hybrid-FT Orbitrap Mass Spectrometer
Seoul Center	X-Ray Diffractometer
	X-Ray Fluorescence Spectrometer
	Inductively Coupled Plasma Atomic Emission Spectrophotometer
	Biomolecule Analysis System (Amino Acid Composition Analyzer)
	Field Emission Scanning Electron Microscope
	Magnetic Property Measurement System
	Field Emission Transmission Electron Microscope
	Focused Ion Beam
	Ion Mobility Mass Spectrometer
	Femtosecond Multi-dimensional Laser Spectroscopic System
	Supercritical Fluid Chromatography System
	Analytical High Resolution Scanning Electron Microscope
	Super Resolution Confocal Microscope
	UPLC-Q/TOF MS Spectrometer
	High Resolution Mass Spectrometer
	Chromatography System
	Protein Sequencing System
	Inductively Coupled Plasma Mass Spectrometer
	Persistant Organic Pollutants System

Area	Equipment
Seoul Center	Biomolecule Mass Spectrometer System (TQ-LC/MS, MALDI-TOF/TOF-MS)
	Atomic Absorption Spectrometer
Busan Center	Elemental Analyzer
	X-Ray Photoelectron Spectrometer System
	Glow Discharge Spectrometer (GDS)
	Secondary Ion Mass Spectrometer
	Angle-Resolved X-Ray Photoelectron Spectrometer
	Multi-Purpose X-Ray Diffractometer
	Transmission Electron Microscope
	UV-VIS Spectrophotometer
	Energy Dispersive X-Ray Fluorescence Spectrometer
	Gas Chromatography-Mass Analysis System
	Inductively Coupled Plasma Atomic Emission Spectrophotometer
	Combustion Ion Chromatograph System
	Nano Secondary Ion Mass Spectrometer
	Thermal Analysis System
	Liquid Chromatography MS/MS Spectrometer System
	Scanning Electron Microscope
	High-Vacuum FT-IR/Raman Imaging Spectrometer System
	Time of Flight Secondary Ion Mass Spectrometer
	Analytical High Resolution Scanning Electron Microscope
Daegu Center	X-Ray Diffractometer
	High Resolution X-Ray Diffractometer
	X-Ray Fluorescence Spectrometer
	Optical Spectrometer (UV/VIS/NIR Spectrophotometer)
	High Resolution Mass Spectrometer
	Electron Microscope System
	Multi-Purpose X-Ray Diffractometer
	High Resolution Scanning Electron Microscope
	Multi-Function X-ray Diffractometer
	Field Emission Transmission Electron Microscope (200 kV)
	Time-Resolved Fluorescence Confocal Microscope
	FT-UV-VIS-IR Spectroscopic Imaging Microscope
	Wavelength Dispersive X-ray Fluorescence Spectrometer
Gwangju Center	400 MHz Nuclear Magnetic Resonance Spectrometer
	X-Ray Diffractometer
	Luminescence and Flourescence Animal Imaging System
	Laser Raman Spectrometer (Photoluminescence Analysis System)
	Field Emission Scanning Electron Microscope
	High Resolution Transmission Electron Microscope
	Time-Resolving and Integrated PL/Raman Spectrometer
	Inductively Coupled Plasma Atomic Emission Spectrophotometer
	500 MHz Nuclear Magnetic Resonance Spectrometer
	600 MHz Online LC-NMR-MS System
	Laser Confocal Scanning Microscope System
	Multi-Functional Transmission Electron Microscope

Area	Equipment
	SPF Animal Facility of Aging Science
	Real-Time PCR
	Automatic Chemistry Analyzer
	Super Resolution Microscope System
	Dual Beam FIB System
	In Vivo X-ray Radiography Micro-CT System
	High Impedence Temperature-Dependent Hall-Effect Measurement System
	Analytical High Resolution Scanning Electron Microscope
Jeonju Center	High Resolution Scanning Electron Microscope
	Field Emission Scanning Electron Microscope
	Particle and Pore Size Analysis System
	Atomic Force Microscope
	Matrix-Assisted Laser Desorption Ionization Mass Spectrometer
	Electron Probe Micro Analyzer
	Micro Raman Spectrometer
	Ultra High Resolution Scanning Electron Microscope
	Field Emission Transmission Electron Microscope
	Cs-Corrected STEM
	Photoluminescence Mapping System
Chuncheon Center	Energy Filtering Transmission Electron Microscope
	Laser Confocal Scanning Microscope System
	Intravital Multi-Photon Confocal Laser Scanning Microscope
	Analytical High Resolution Scanning Electron Microscope
	Field Emission Transmission Electron Microscope
Suncheon Center	Multi-Purpose X-Ray Diffractometer
	High Resolution Scannig Electron Microscope
	Field Emission Transmission Electron Microscope
	Differential Scanning Calorimeter/Thermal Analyzer
Jeju Center	Organism Component Separation Analysis System
	Analytical High Resolution Scanning Electron Microscope
	Inductively Coupled Plasma Mass Spectrometer
Western Seoul Center	400 MHz Solid State Nuclear Magnetic Resonance Spectrometer
	Single Crystal X-Ray Diffractometer System
	500 MHz FT-Nuclear Magnetic Resonance Spectrometer
	600 MHz Solid State Nuclear Magnetic Resonance Spectrometer
	200 MHz Solid State Nuclear Magnetic Resonance Spectrometer
	CW/Pulse EPR System
	Online LC-MS-NMR System
	500 MHz FT-NMR Spectrometer
	Gas Chromatograph/Mass Spectrometer
	Liquid chromatograph/Mass Spectrometer
	Pyrolysis-Gas Chromatograph/Mass Spectrometer System
	700 MHz FT-NMR Spectrometer
	SPE-800 MHz NMR-MS System
	Multi Purpose X-Ray Diffractometer
	High Resolution Scanning Electron Microscope

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