



"Multi-purpose Synchrotron Radiation" in Ochang
(To be completed in 2027)

The "Multi-purpose Synchrotron Radiation" which will be completed in 2027, is a 4th generation synchrotron radiation and is a national research facility required to foster basic science and to improve industrial R&D capabilities.
KBSI will lead the new future 100 years of science and technology in Korea by successfully establishing a synchrotron that will be the cornerstone of various high-tech industries and basic science fields.

- [Accelerator] Beam Energy: 4 GeV, Storage Ring Circumference: 800 m,
Brightness: Approximately 100 times brighter than the 3rd generation synchrotron radiation
- [Beamlines] 10 units (up to 40 units)
- [Construction] Completed in 2027, fully operational in 2028

CONTACT INFORMATION

Daedeok Headquarters	169-148, Gwahak-ro, Yuseong-gu, Daejeon, Korea [34133] Tel. +82 42.865.3500 Fax. +82 42.865.3565
Ochang Center	162, Yeongudanji-ro, Ochang-eup, Cheongwon-gu, cheongju-si, Chungcheongbuk-do, Korea [28119] Tel. +82 43.240.5001 Fax. +82 43.240.5029
Seoul Center	Natural Science Campus, Korea University, 145 Anam-ro, Seongbuk-gu, Seoul, Korea [02855] Tel. +82 2.6943.4100 Fax. +82 2.6943.4108
Busan Center	60, Gwahaksandan1-ro, Gangseo-gu, Busan, Korea [46742] Tel. +82 51.974.6101~3 Fax. +82 51.974.6116
Daegu Center	Joint Experiment & Practice Hall, Kyungpook National University, 80, Daehak-ro, Buk-gu, Daegu, Korea [41566] Tel. +82 53.717.4321 Fax. +82 53.717.4329
Gwangju Center	Chonnam National University, 77, Yongbong-ro, Buk-gu, Gwangju, Korea [61186] Tel. +82 62.712.4409 Fax. +82 62.530.0519
Jeonju Center	Life Science Hall, Chonbuk National University Hospital, 20, Geonji-ro, Deokjin-gu, Jeonju-si, Jeollabuk-do, Korea [54907] Tel. +82 63.711.4528 Fax. +82 63.711.4509
Chuncheon Center	Jiphyeongwan, Gangwon National University, 1, Gangwondaehak-gil, Chuncheon-si, Gangwon-do, Korea [24341] Tel. +82 33.815.4602 Fax. +82 33.255.7273
Western Seoul Center	Corporate Collaboration Center, 150, Bugahyeon-ro, Seodaemun-gu, Seoul, Korea [03759] Tel. +82 2.6908.6211 Fax. +82 2.6908.6215

EQUIPMENT UTILIZATION (ANALYSIS SUPPORT) HOTLINE

Tel	1577-3639(Paid by caller), 14-3333(Paid by receiver) (ARS : Bio 1, Bioimaging 2, Spectroscopic analysis 3, Materials imaging 4, Elemental analysis 5, Isotopes 6, Radiation 7, Emergency analysis/other 8)
------------	---

Homepage
www.kbsi.re.kr



KBSI KOREA BASIC
SCIENCE INSTITUTE

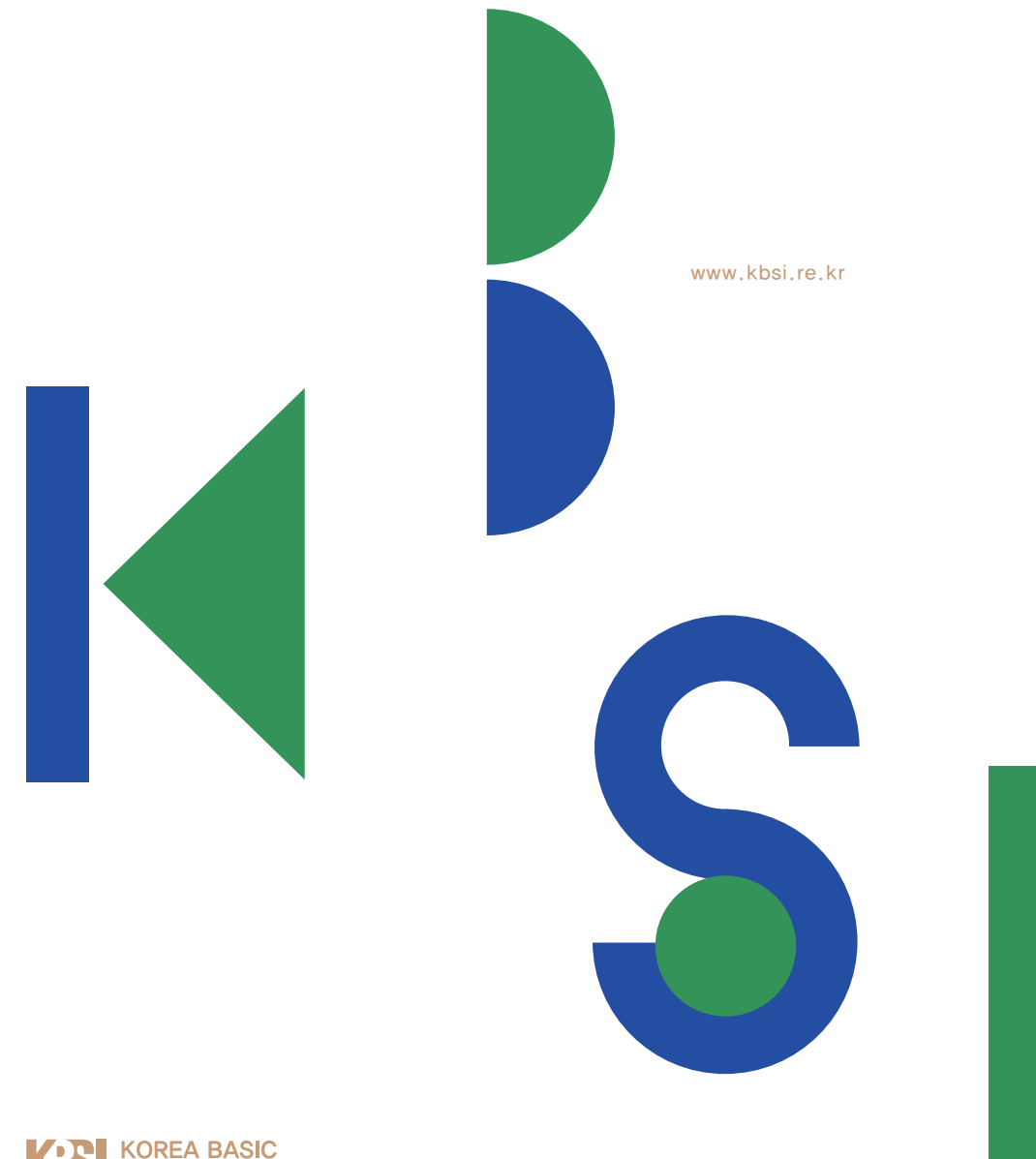
169-148, Gwahak-ro, Yuseong-gu, Daejeon, Republic of Korea [34133]
TEL. +82 42-865-3500 FAX. +82 42-865-3565

World-class open
research platform

creating the advance in
science and technology and
people's happiness

KBSI
Korea Basic
Science Institute

www.kbsi.re.kr



KBSI KOREA BASIC
SCIENCE INSTITUTE

Mission

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

Vision

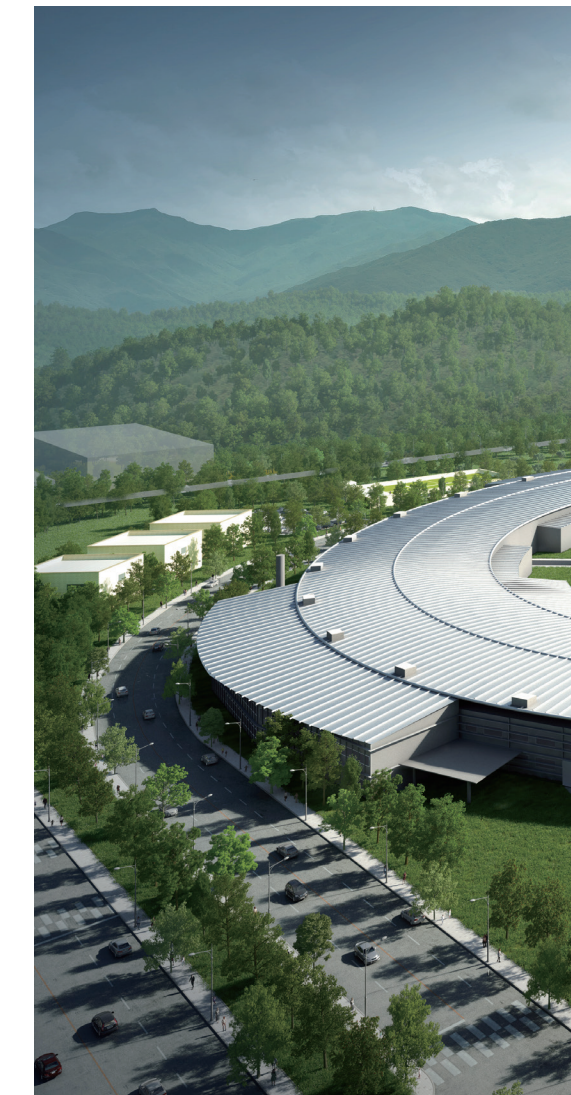
World-class open research platform creating
the advance in science and technology and
people's happiness

Main Function

Leading the comprehensive development of
research infrastructure that
drives national innovative growth

Conducting analytical science research
that maximize the use of
national research infrastructure

Sharing and spreading
the analytical science technology to Improve
national R&D competitiveness



KBSI,
the organization
responsible for
the Multi-purpose
Synchrotron Radiation
Construction Project

OPEN UTILIZATION OF
ADVANCED RESEARCH
EQUIPMENT AND
RESEARCH SUPPORT

Competitive Analytical Services

- Accumulating know-how and competency in the operation of analytical services, development of analysis technology, improvement of analysis system

Research Support for Joint Research Involving Industrial,
Academic, and Research Institutes

- Establishing research infrastructure for open research convergence and cooperation

National Research Support Network

- Establishing open research infrastructure for convergence and cooperation nationwide research support network

KBSI NETWORK

Division of Analytical Science

- **Research Center for Materials Analysis** Material Research for Energy & Environmental Science
- **Research Center for Geochronology & Isotope Analysis** Geochronology, Isotope Geochemistry, Environmental Radioactivity
- **Research Center for Bioconvergence Anaysis** Biomedical Omics, 3D Structure and Function of Proteins, Bioimaging-based Theragnostics

Division of Scientific Instrumentation & Management

- **Center for Scientific Instrumentation** Developing Research Equipment and Core Technology
- **Center for Research Equipment** Electron Microscopy & Spectroscopy Analysis, Chemical Analysis, Earth & Environmental Analysis, Engineering Support

Division of Regional Analytical Science

- **Seoul** Biomedical, Spatiotemporal Molecular Imaging Research, Environment Response Research
- **Busan** Advanced Materials based on Surface Analysis Science
- **Daegu** Functional Materials Research
- **Gwangju** Advanced Aging Science Research, Material Structure Analysis
- **Jeonju** Advanced Materials with Nano Technology
- **Chuncheon** Biomedical Imaging Research
- **Western Seoul** Biomedical Convergence Research, Energy Materials Convergence Research

TRAINING OF
ANALYTICAL SCIENCE
RESEARCHERS

KBSI Research Equipment Academy

- Conducting tailored educational programs for specialist and general operators

KBSI's Popularization of Science

- Inspiring and motivating students to pursue careers in science and technology through outreach programs such as "X-Science" and "Junior Doctor"

Research Equipment Engineer Education Program

- Running a training program to foster research equipment experts in various areas such as operation and management of research equipment, repair and maintenance, analytical science, and equipment development

Graduate School of Analytical Science and Technology (GRAST)

- Producing master's and doctoral degree holders in analytical science (graduate school jointly established with Chungnam National University)

KBSI, as the nation's leading institute in the joint utilization of research equipment and research support, drives the development of national science and technology based on advanced research equipment, outstanding human resources, and excellent infrastructure.



OPERATION OF
LEADING-EDGE
EQUIPMENT

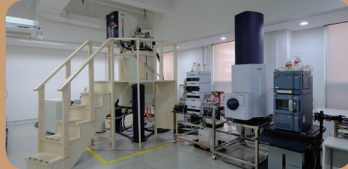
Using its leading-edge research equipment, KBSI seeks to establish a global platform, thereby encouraging prominent local and international scientists to produce multidisciplinary research outcomes.

Convergence(Omics, Hazardous substances, Materials)



15 T FT-ICR MS
15 T Fourier-Transform Ion Cyclotron Resonance Mass Spectrometer

Crude oil composition, tracing origin, natural organic matter, metabolite analysis



800 MHz NMR-MS
800 MHz Nuclear Magnetic Resonance Mass Spectrometer System

Analysis of drug efficacy and toxicity, analysis of clinical samples, plant and nutritinal metabolome analysis, environmental metabolome analysis



FMLS
Femtosecond Multi-Dimensional Laser Spectroscopic System

Research on chemical reaction mechanisms of molecules in condensed phase, research on ultrafast charge carrier dynamics of nano-energy materials, label-free bio-imaging of microparticles with CARS microspectroscopy

Materials(Physical & Chemical properties)



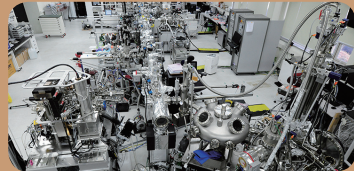
HVEM
High Voltage Electron Microscope

Atomic-scale structural analysis of nanostructured materials, 3D electron tomography, electron structure/chemical analysis (HV-EELS), In situ TEM study of structural changes in materials



Mono Cs STEM
Atomic Resolution Electronic Structure Scanning Transmission Electron Microscope

Structure & chemical analysis for semiconductor device, nano-structure analysis for new functional materials, bio-materials imaging and structure analysis, analysis for next gen. energy materials



AiSAS
Advanced in situ Surface Analysis System

Full UHV transfer between the steps of thin-film manufacturing, surface analysis, and performance evaluation
In-situ/operando analysis systems for batteries, fuel cells, catalysts, and sensors

Environmental(Geochronology, microelement)



SHRIMP
Sensitive High Resolution Ion MicroProbe

U-Pb geochronology, In situ isotopic chemistry of microtexture, cosmochemistry and geochronology of Meteorite



IMS1300
Ultra High-Resolution Isotope Microscope System

Geochemistry/paleoclimate and cosmochemistry, geochronology, small particle analysis, high-resolution ion imaging

DEVELOPMENT
OF ANALYTICAL
TECHNOLOGIES

With its state-of-the-art research equipment infrastructure and analytical science technologies, KBSI restlessly continues to pioneer on new research frontiers through joint convergence research engaging the industrial, academic, and research professionals to develop fundamental technologies for the future, accessible technologies to resolve national and social problems, and convergence technologies.

Development of Analytical Technology for Materials, Parts, and Equipment

- Providing support to meet the country's strategic needs and to solve issues faced by companies

Development of High-sensitivity Diagnostic Platform for Detection of Infectious Viruses

- Developing a highly sensitive diagnostic platform for on-site early detction of various diseases including infectious diseases

Analytical Technology in Disaster Science

- Conducting research on analytical techniques for swift prevention and resolution of national-level environmental disasters and accidents

Analytical Technologies Determine the Geographical Origins of Various Agricultural Products

- Developing integrated analytical technologies and standardization systems to identify the origins of agricultural products

Bioimaging Assessment of Theranostics

- Developing integrated analytical technologies for targeted therapy, including anticancer drugs and cell therapeutics

Bio(Bioimaging)



7 T Human MRI
7 T Human Magnetic Resonance Imaging Scanner

Brain studies of microstructure, disease, and function based on improved sensitivity and magnetization rates
an intermediation study using animals (monkeys, pigs, etc.) for human research

Bio(Cell & Protein Structures)



Bio-HVEM
Bio-High Voltage Electron Microscope

Action mechanism of targeted therapy for intractable diseases, 3D analysis of neurodegenerative brain cells, discovery of new drug candidates



Cryo-EM System
Cryo-Electron Microscope System

Determination of 3D structures of biomolecules, determination of 3D structures of organic-inorganicmolecules using nanometer crystals, determination of 3D structures of proteins in vivo



900 MHz NMR
900 MHz Nuclear Magnetic Resonance Spectrometer

Structural analysis of protein and natural products, protein-protein interaction and dynamics, screening of lead discovery and metabolomics

KBSI
Korea Basic Science Institute

FOSTERING THE
DOMESTIC RESEARCH
EQUIPMENT INDUSTRY

KBSI plays a leading role in fostering the domestic research equipment industry, including developing research equipment for analytical science, assessing and improving domestic equipment performance, and advancing the utilization of domestic equipment. To promote awareness of the excellence of domestic research equipment, the institute is jointly developing research equipment with industries, universities, and research institutes, as well as establishing policies and support systems necessary for commercialization.

Establishment of a Performance Assessment System for Research Equipment, and Operation of a Laboratory for Domestic Equipment Utilization

- Proposing bills and enactments of legislation to foster the research equipment industry and create a thriving ecosystem
- Improving performance by validating the superiority of domestic equipment, enhancing reliability, and providing technical consulting/support

Development of Analytical Science Research Equipment

- Multi-mode nano-bio optical imaging system, 3D molecular imaging mass spectrometer(TOF SIMS), Cs-corrected Transmission Electron Microscope (Cs-TEM), high-throughput 3D cell culture & imaging platform, Electro-Magnetic Properties measurement System (EMPS), raman spectroscopy-based analysis system for mechanical properties

Providing Education to Enhance Employee Capacities of Research Equipment Companies

- Using R&D infrastructure to provide support in enhancing the capacities of workers in research equipment development and operation

Operation of a Smart Open Lab and Ultra-Precision Tech Shop

- Serving as a hub for cooperation between industries and research institutes through the establishment of an open laboratory and ultra-precision processing facilities

OVERALL
MANAGEMENT OF
NATIONAL RESEARCH
FACILITIES AND
EQUIPMENT

To improve national R&D output through supporting the management of research facilities and equipment, NFEC has been instrumental in policy making and systematically promoting investment efficiency and sharing of research equipment.



Promotion of Sharing of Research Equipment

- General education on national research facility management and ethics
- Information services of national research facilities and equipment
- Knowledge Sharing Forum for research equipment engineer
- Operation of support program for equipment transfer

Strategic Investment

- Preliminary Feasibility Studies (F/S)
- Operation of a deliberative system for national research facilities and equipment
- The National Large Research Facilities Roadmap (NFRM)
- Management of total project costs/project management of national large-scale research facilities

Overall Operational Management

- Support for development of standard guidelines
- Support for enactment/amendment of statutes
- Establishment of national research facilities and equipment improvement plan
- Survey on the management and utilization of research equipment
- Survey/analysis and performance management of national research facilities and equipment