VIII. RESEARCH ACTIVITIES

VIII-I. SUMMARY OF RESEARCH ACTIVITIES

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VIII-I-1. MEETINGS AND SEMINARS

Specialists' Meetings Held in the FY 2012

1. The Research Overview of Biological Effects of Long-term Radiation Exposure
2. Proceedings of the Specialists' Meeting on Radioactive Wastes Management
3. Proceedings of the Specialist Research Meeting on "Abnormal Protein Aggregation and the Folding Diseases, and their Protection and Repair System
4. The Latest Study on Analysis of Trace Amount of Elements using Activation Analysis
5. Novel Development of BNCT - From Special to General -
6. 2012 Symposium on Nuclear Data
7. Proceedings of the Specialist Meeting on Positron Annihilation Study for Science and Engineering 2012
8. Research & Development for Analysis Method of SANS
9. Development and Application of Useful Radiotracers
10. Proceedings of the Specialist Research Meeting on Science and Engineering of Unstable Nuclei and Their Uses on Condensed Matter Physics

Workshops Organized in the FY 2011

1. Workshop of Next Neutron Source for Beam Utilization after KUR
2. Workshop on KUR Utilization and New Neutron Source
3. Workshop on Materials Irradiation Effects and Applications 2012
4. 2012 Japan-Korea Joint Summer School on Accelerator and Beam Science, Nuclear Data, Radiation Engineering and Reactor Physics

Special Meeting Held in the FY2012

Meeting on the Future Project of the Kyoto University Research Reactor Institute

VIII-I-2. COLLABORATION RESEARCH AND VISITING SCIENTISTS

Visiting Scientists

The number of project researches	11
(The number of allotted research subject)	(85)
The number of general joint researches	117
The total man-days of visiting scientists	1138

VIII-I-3. EXPERIMENTAL RESEARCH

VIII-I-3-1. LIST OF PROJECT RESEARCH

[Project 1]	Irradiation Effects on Microstructural Evolution in Materials Irradiated by Particles with High Energy
[Project 2]	Application Studies on Effective Use of F-Elements
[Project 3]	Project Research on Science and Engineering of Unstable Nuclei and Their Uses on Condensed Matter Physics
[Project 4]	Development on Neutron Imaging Application
[Project 5]	Project Research on the Abnormal Aggregation of Proteins by Post-Translational Modifications, and Study of Repair Mechanism
[Project 6]	Analyzing Tumor Microenvironment and Exploiting its Characteristics for Controlling Malignant Solid Tumors and Distant Metastatic Potential
[Project 7]	Direct Observation of the Proton or Protonation in a Protein Molecule by Neutron and High Resolution X-ray Joint Analysis

[Project 8] Project Research on the New Applicant Development Using the Characteristics of the Particles from the Neutron Capture Reaction

[Project 9] Project Research on Development of Scattering Spectrometers Utilizing Small and Medium Class Neutron Source

[Project10] Creation of Unique Neutron Irradiation Experiments Using B-2 Beam Hole of KUR

[Project 11] Behavior of Radioactive Nuclides in Intense Radiation Fields in Accelerator Facilities

VIII-I-3-2. LIST OF COLLABORATION RESEARCH

1. Slow Neutron Physics and Neutron Scattering

CO1-1 Boron Neutron Capture Therapy for Malignant Brain Tumors Using Epithermal Neutron (24027)

CO1-2 Development of Neutron Devices for Fundamental Physics (24053)

CO1-3 Development of a DLC Coating for Polarized UCN Guide (24077)

CO1-4 Test of Mass Production of Neutron Supermirrors for Real Neutron Guide by Using KUR-IBS (24087)

2. Nuclear Physics and Nuclear Data

CO2-1 Radiochemical Measurement of Photonuclear Reaction Yields for Photon Activation Analysis (24071)

CO2-2 Precise Measurements for Epi-Thermal Neutrons Using Two Different Scintillators (24074)

CO2-3 Measurements of Neutron Capture Cross Section for ^{74}Se, ^{76}Se and ^{77}Se at KURRI-LINAC (24076)

CO2-4 Measurement of Gamma Ray and Neutron Spectrum of Curium Isotope (24096)

CO2-5 Measurements of Thorium-Fueled Core Characteristics and Replacement Worth of Thorium Plates to Aluminum Plates (3) (CA24105)

CO2-6 Measurements of Replacement Worth of Thorium Plates to Aluminum Plates at EE1 Core (CA24108)

3. Reactor Physics and Reactor Engineering

CO3-1 Development of In-Reactor Observation System Using Cherenkov Light (IV) (24038)

CO3-2 Evaluation of Activation Products for Decomissioning (24070)

CO3-3 Performance Evaluation of Radionuclide Monitoring Systems during Reactor Operation (24093)

CO3-4 Neutronic Characteristics of Lead in KUCA A core for Accelerator-Driven System (CA24101)

CO3-5 Development of Activation Foil Neutron Detector for Angular Distribution Measurements of Epi-Thrermal Neutrons in Reactors (CA24103)

CO3-6 Development of Subcriticality Measurement for Accelerator-Driven Reactor (VII) (CA24104)

CO3-7 Active Gamma Ray Spectroscopy of Sub-Critical System Containing Stainless Steel (CA24106)

CO3-6 Development of Subcriticality Measurement for Accelerator-Driven Reactor (VII) (CA24104)

4. Material Science and Radiation Effects

CO4-1 Structural Change of Surfactant Micelles by Ion Capturing (24007)

CO4-2 DMSO-Assisted Grafting of Acrylamide onto PET Film by γ Irradiation (24010)

CO4-3 Mössbauer Spectroscopy of Multiferroic Iron Oxides in Applied Magnetic Field (24011)

CO4-4 Broadband Spectroscopy of Nanoporous-Gold Promoter (24021)

CO4-5 Tritium Release from Li4SiO4 Ceramic Breeder Materials Doped with Ti (24026)

CO4-6 Absorption Spectroscopy with the Coherent THz Radiation from Linac Electron Beams (24056)

CO4-7 γ-Ray-Induced Preparation of Porous Binary Polymer Hydrogels (24059)

CO4-8 γ-Ray Irradiation Effects for Metal Complexes with Cage-Type Silsesquioxane Ligand (24060)

CO4-9 Synthesis of Metal Nanoparticles Under the Gamma-ray Irradiation Field (24063)

CO4-10 Magnetic Order of Fe in Normal Conducting $Sr_2VFeAsO_{3-d}$ Probed by ^{57}Fe Mössbauer Spectroscopy (24064)

CO4-11 Complex Structure of Ions Coordinated with Hydrophilic Polymer. 13: (24079)

CO4-12 Design and Preparation of the Electrochemical Cell for the Study of the Ion Distribution at the Electrochemical Interfaces of Ionic Liquids Using Neutron Reflectometry (24082)

CO4-13 Irradiation Effect on Tritum Migration Process in Tritium Breeding Material for Fusion Reactor (24083)

CO4-14 Absorption Spectrum of Water in the Terahertz Region Using a Near-Field Aperture Probe (24084)

CO4-15 Property of Coherent Transition Radiation Emitted from a Pair of Wire-Grid Radiators (24085)

CO4-16 Charaterizations of Dynamic Behavior for Organic Solar Cells under High-Energry Secondary Electrons by ^{60}Co Beams (24095)

CO4-17 Activation Analysis of Tungsten Deposited on Graphite Tiles of JT-60U Tokamak (24100)

CO4-18 Ground Plane of the B–3 Beam Port of KUR (24106)

CO4-19 Radiation Anomaly Invesitgation of Nano-Satellite “Horyu-II” (24108)

5. Geochemistry and Environmental Science

CO5-1 Study of Earth and Planetary Matters by Thermoluminescence (24004)

CO5-2 Measurement of Environmental Radioactivity and Heavy Metal in Seaweed Samples (24013)

CO5-3 Radiometric Dating for Paleoenvironmental Study of East Asia (24017)

CO5-4 Behavior of Cesium during the Melting of Model Soil (24019)

CO5-5 Foliar Uptake and Volatilization of Iodine Applied to a Leaf Surface in Small Drops (24024)

CO5-6 Neutron Activation Analysis of Elemental Concentrations in Atmospheric Aerosols at Sakai, Osaka (24032)

CO5-7 Evaluation of Hypoxia at Dredged Trenches in Tokyo Bay by Determination of Fe and Mn in the Sediments (24049)

CO5-8 The Possibility of Radionuclide Detection in Atmospheric Precipitation far from Fukushima (24055)

CO5-9 Study on Thermal History of Rock Sample Based on Fission Track Dating Method (24061)

CO5-10 Determination of Abundance of Rare Metal Elements in the Currently Forming Antimony Ore Deposits of Kagoshima Bay by INAA Techniques (24062)

CO5-11 Determination of Abundance of Rare Metal Elements in Seafloor Hydrothermal Ore Deposits by INAA Techniques-2: Determination of Indium Content (24065)

CO5-12 ^{40}Ar/^{39}Ar Age of Volcanic Tuffs in the Eastern Africa II (24066)

CO5-13 Geochemistry of Unbrecciated Diogenite, Yamato 002875 (24072)

CO5-14 Comparison of RNAA Data with ICP-MS Data for Halogen in Sedimentary Rock Samples (24086)

CO5-15 Cadmium Analysis in Pigments by INAA (24094)

CO5-16 Neutron Activation Analysis of Trace Mn in Iron Meteorites (24099)

CO5-17 Study on Sorption Behavior of Trace Elements in Sedimentary Rocks and Bentonite Using Sequential Extraction Method (24104)

CO5-18 Geochemical Mapping for the Upper Ara-river System Area, Saitama Prefecture by Neutron Activation Analysis (II) (24105)

6. Life Science and Medical Science

CO6-1 Measurement of Trancemitance Spectra of a Cryo-Sectioned Tissue of Brain Tumor C6 Model in the Terahertz Reagion (24002)

CO6-2 Carotenoid-Producing Lactobacillus plantarum Is Resistant to γ-Ray Irradiation (24003)

CO6-3 Estimation of Damage Localization in DNA Irradiated with Ionizing Radiations in Water (24005)

CO6-4 Structure Specificity of Radio-Induced Biomolecule Damage and Its Effect on Radio-Biological Consequence (24015)

CO6-5 NAA for Trace Elements in Scalp Hair of Patients with ALS (the second report) (24018)

CO6-6 Mechanism Involved in Tumor Tissue of Colon 26 Carcinoma-Bearing Mice Irradiated with Neutron in the Presence of BSH-Appended Polyamine (24022)

CO6-7 A New Reagent for Disulfide-Coupled Protein Folding (24033)

CO6-8 Study of Effect on Elemental Levels in Marine Samples Caused by The Great East Japan Earthquake in Ishinomaki Area (24068)

CO6-9 Evaluation of Time-Dependence of the Concentration of Gadolinium-Based trast Agent, Manganese, and Zinc in Normal and Nephrectomized Mice (24080)

CO6-10 Mössbauer Studies on Reversible O-O Bond Scission of Peroxodiiron(III) to High-Spin Oxodiiron (IV) (24092)

CO6-11 Determination of Trace Elements in Organs and Tissues of Zn-Deficient Mice (24101)

7. Neutron Capture Therapy

CO7-1 Establishment of QA/QC for BNCT Neutron Irradiation Field (24009)

CO7-2 To Conquer the Clinically Relevant Radioresistant Cell Tumors Targeting Tumor Endohtelial Cells (24012)

CO7-3 Study on Advanced Neutron Measurements Using a Small Size Neutron Scintillator (24014)

CO7-4 High Boron Content Liposomes and Their Promising Antitumor Effect for BNCT (24023)

CO7-5 Long-Term Result of BNCT for Different Types of Human Clear Cell Sarcoma in Mouse Model (24029)

CO7-6 Application of B4C Nanoparticles for Boron Neutron Capture Therapy (24030)

CO7-7 Development of Novel Boron Compounds for BNCT (24036)

CO7-8 BNCT for Malignant Melanoma and Head and Neck Cancer (24037)

CO7-9 Study on the Semiconductor Device Error Irradiated with Thermal Neutrons (24043)

CO7-10 Tissue Changes by BNCT of the Oral Cancer Tissue at Having Used Hyaluronan Conjugated PEG Liposome (24046)

CO7-11 Development of Water-Soluble Gd Metallofullerenes/PEG-b-Polyamine Complexed Nanoparticles for Neutron Capture Therapy (24047)

CO7-12 Pilot Biodistribution Study of Poly-ion Complex Mediated Gadrinium Delivery System to Cancer Model *In vivo* (24050)

CO7-13 Pilot Clinical Study of Boron Neutron Capture Therapy for Recurreced Hepatic Cancer (24051)

CO7-14 Development of Boronated Liposome for Boron Neutron Capture Therapy (24052)

CO7-15 The Benefit of High LET-Radiation to Glioma Stem-Like Cells (24054)

CO7-16 A Biodistribution Study of Carboran Sugar (24057)

CO7-17 Clinical Studies on BNCT for 5 Cases of Head and Neck Cancer (24088)

CO7-18 B4C Particle as a Boron Compound for BNCT (24089)

CO7-19 Microdosimetry of Neutron Field with Low-Enriched Uranium at Kyoto University Reactor (24098)

CO7-20 Combination therapy of C6 Glial Tumor Cell by BNCT and PDT Sensitized by a Boron Lich Porphyrin Derivative (24103)

9. TRU and Nuclear Chemistry

CO9-1 Study on the Production and Chemical Separation Methods of Technetium as an Assay Tracer (24075)

CO9-2 Adsorptivity of Polyvinylpolypyrrolidone Irradiated by γ-Ray in HNO3 to Metal Ions in HCl (24091)

10. Health Physics and Waste Management

CO10-1 Activation Analysis for Soils of Hiroshima・Nagasaki City and Gamma-ray Exposure Due to Neutron-induced Radionuclides by Atom Bomb (24006)

CO10-2 Damage of Semiconductor Equipment by Radiation Exposure (24078)

CO10-3 Study on Neutron Response of Criticality Accident Alarm System Detector to Quasi-Monoenergetic 24 keV Neutrons (24107)

11. *Accelerator Physics*

CO11-1 Progress of Terahertz-wave Spectrophotometry by Compton Backscattering of Coherent Synchrotron Radiations at KURRI-LINAC (24008)

12. *Others*

CO12-1 Terahertz Absorption Spectra of Cholic Acid and its Sodium Salt (24001)

CO12-2 A Brain Radiation Necrosis Model in Laboratory Animals (24028)

CO12-3 Radiation-Induced Luminescence for Applying to Retrospective Dosimetry (24031)

CO12-4 Thickness and Density of Adsorbed Additive layer onto Metal Surface under High Temperature and High Pressure Evaluated by TOF-Mode Neutron Reflectometry (24035)

CO12-5 Neutron Activation Analysis for Hafnium in Hafnium Oxide Films (24044)

CO12-6 Mössbauer Microspectrometer for Geosciences (24045)

CO12-7 Precise Determination of Br in PP Resin Pellet by Instrumental Neutron Activation Analysis Using Internal Standardization (24048)

CO12-8 Development of Neutron Irradiation Field for Biological Research by Electron Linear Accelerator (24069)

CO12-9 Determination of Nitrate Nitrogen Produced Through Photochemical Reaction Using Brucine Method (24090)

CO12-10 Evaluation of Multiwire-Type Two-Dimensional Neutron Detector with Individual Line Readout Brucine Method (24097)

VIII-I-3-3. LIST OF ORIGINAL RESEARCH

OR1 Effect of Tirapazamine and Mild Temperature Hyperthermia on the Recovery from Radiation-Induced Damage in Pimonidazole-Unlabeled Quiescent Tumor Cells