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**Monday, August 25, 2014, 8:00 A.M.**

**ISOTOPES GENERAL PLENARY—I**  
Session Organizers: Paul T. Dickman (ANL), Rolf Zeisler (NIST), Stephen P. LaMont (LANL)  
Cochairs: Dale Klein (UT System), Jong-Kyung Kim (KAERI)

- **Economics of Radioisotope Production and Sustainability**  
  Ron Cameron (OECD Nuclear Energy Agency), invited

- **Isotope Developments in the Australian Setting**  
  Adri Paterson, Karina Meredith, Quan Hua (ANSTO), invited

- **Production Capacities of ROSATOM Isotope Complex**  
  Aleksey Vakulenko (JSC Isotope), invited

- **U.S. Department of Energy Isotope Production and Research**  
  Marc A. Garland (DOE), invited

**Monday, August 25, 2014, 10:10 A.M.**

**ISOTOPES GENERAL PLENARY—II**  
Cochairs: Adi Paterson (ANSTO), Mark Peters (ANL)

- **Stable Isotope Enrichment Methods—Historical Review and Future Trends**  
  Darren Brown (Trace Sciences International), invited

- **Radioisotopes and Radiation Technology in Industry**  
  Meera Venkatesh, Patrick Brisset, Sunil Sabharwal, Agnes Safrany (IAEA), invited

- **Transforming the Playing Field; Personalized Medicine Using Theragnostic Radiopharmaceuticals**  
  Suresh C. Srivastava (BNL), invited

- **Accelerator-Based Production of Mo-99**  
  Thomas J. Ruth (TRIUMF/BC Cancer Agency), invited

**Monday, August 25, 2014, 1:00 P.M.**
REACTOR-BASED PRODUCTION OF Mo-99—I
Session Organizers: Natesan Ramamoorthy (BARC), James S. Welsh (NIU Inst for Neutron Therapy)
Cochairs: Natesan Ramamoorthy (BARC), Carmen Bigles (Coquí Radio Pharmaceuticals Corp.)

Improvements to Production and Supply of LEU Molybdenum
Mark Moore, Aaron Flett (ANSTO), invited

Future U.S. Supply of Mo-99 Production Through Fission Based LEU/LEU Technology
James Welsh, Carmen I. Bigles-Raldiris, Alejandro Valderrabano (Coquí RadioPharmaceuticals Corp.), invited

A Small Reactor Design for $^{99}$Mo Production with Novel Fuel
Gary Stange (Univ of Wisconsin, Madison/Morgridge Inst for Research), Thomas Mackie, Michael Corradini (Univ of Wisconsin, Madison)

A Novel Micro-Porous Sorbent for $^{99}$Mo/$^{99m}$Tc Generator Using $(n,\gamma)$ $^{99}$Mo
Lou Centofanti, Tom Yarbrough, Robert J. Schreiber, Sally McQuaid, Shameem Hasan (Perma-Fix Environmental Services Inc.)

Metallurgical Considerations for the Fabrication of LEU Dispersion Targets with a High Uranium Density for MO-99 Production
Ho Jin Ryu (KAIST), Yong Jin Jeong, Ji Min Nam, Jong Man Park (KAERI)

Options for the Separation of Medical Isotope Molybdenum-99 from Low Enriched Uranium Solutions

Six Problems with the Six-Day Curie and a Solution
Adi Paterson, Michael Druce, Elizabeth Killen (ANSTO)

APPLICATIONS IN NUCLEAR MEDICINE—THERAPEUTICS
Session Organizers: Meera Venkatesh (IAEA), Bryan P. Bednarz (Univ of Wisconsin, Madison)
Cochairs: Silvia Jurisson (Washington Univ, St. Louis), Adriano Duatti (IAEA)

Dosimetry-Based Treatment Planning: Personalized Medicine in Radiopharmaceutical Therapy
Robert Hobbs (Johns Hopkins Univ), invited

Merging Therapeutic and Diagnostic Imaging: Phospholipid Ether-Based Targeting Approaches for Broad Spectrum Cancer Detection and Treatment
Joseph Grudzinski (Univ of Wisconsin, Madison/Cellectar Biosciences, Inc.), invited

Towards Multiscale Personalized Dosimetry for Dipeutic Radiopharmaceuticals
Bryan Bednarz, Abigail Besemer (Univ of Wisconsin, Madison), Joseph Grudzinski (Univ of Wisconsin, Madison/Cellectar Biosciences, Inc.), Benjamin Titz (Cellectar Biosciences), Paul Wickre (Univ of Wisconsin, Madison), Jamey Weichert (Univ of Wisconsin, Madison/Novelos Therapeutics, Inc.), Lance Hall (Univ of Wisconsin, Madison), invited

Preparation and Evaluation of Sn-117m Annexin for Vulnerable Plaque
Jaime Simón, Jason A. Rogers, George M. St. George, R. Keith Frank, Scot H. Ellebracht (IsoTherapeutics Group, LLC), Nigel R. Stevenson, David W. Mueller, Gilbert R. Gonzales (Clear
Vascular, Inc.)

**CycloSam® Sm-153 DOTMP, A New Therapeutic Bone Agent**
Jaime Simón, R. Keith Frank, Prakash U. Bakhu (IsoTherapeutics Group LLC), Richard E. Wendt (Univ of Texas M.D. Anderson Cancer Center), Jimmy C. Lattimer, Kim A. Selting, Alan R. Ketring (Univ of Missouri)

**Antitumor Effect of Radioactive CISPLATIN (195mPt) Produced by Photonuclear Method**
E. Bodnar (Trauma Risk Management Research Inst), N. Dikiy, E. Medvedev (Kharkov Inst of Physics and Technology)

**CALIBRATION METHODS, FUNDAMENTAL NUCLEAR DATA, AND AIRBORNE EFFLUENTS FROM MEDICAL ISOTOPE PRODUCTION**
Session Organizer: Steven R. Biegalski (Univ of Texas, Austin)
Cochairs: Steven Biegalski (Univ of Texas, Austin), Derek Haas (PNNL)

**Calibrating a New Generation of Field Nuclear Measurements for Treaty Inspections**

**Electron-Photon Coincidence Decay of 127Xe**
Franziska J. Klingberg, Steven R. Biegalski (Univ of Texas, Austin), Derek Haas, Amanda Prinke (PNNL)

**Determination of Short-Lived Fission Product Yields with Gamma Spectrometry**
Kenneth Dayman, Steven Biegalski (Univ.of Texas, Austin), Derek Haas (PNNL)

**Radioxenon Measured and Predicted Detections from Southern Hemisphere Medical Isotope Production Facilities**
Justin D. Lowrey, Paul W. Eslinger, Brian T. Schrom, Judah I. Friese, Derek A. Haas, Harry S. Miley (PNNL)

**Stack Monitoring at the BatanTeknologi Medical Isotope Production Facility**

**Local Transport of Radioxenon Released from the Chalk River Laboratories Medical Isotope Facility**
Christine Johnson, Steven Biegalski (Univ of Texas, Austin), Justin Lowrey, Derek Haas (PNNL)

**PRODUCTION OF NON-PET RADIONUCLIDES**
Session Organizers: Nigel R. Stevenson (Clear Vascular, Inc.), Flavia Groppi (U and INFN Milano)
Cochairs: Nigel Stevenson (Clear Vascular, Inc.), Flavia Groppi (U and INFN Milano)

**Methods of Producing High Specific Activity SN-117M with Commercial Cyclotrons**
Nigel Stevenson (Clear Vascular, Inc.), invited
The Past, Present and Future of Cyclotron-Based Large Scale SPECT Radioisotopes Production
Jean-Michel Geets, Sylvain Savaria (IBA), invited

Cyclotron Production of SPECT Isotopes
Jozef Orzechowski (TRIUMF), Jerry Porter (Nordion), invited

Isotope Production Using Automated Separation of Irradiated Liquid Targets
George M. St. George, Jaime Simón (IsoTherapeutics Group LLC), Nigel Stevenson (TcNet LLC)

Building on TR-24 Success—ACSI Launches a New Cyclotron Model
Russell Watt, William Gyles, Alexander Zyuzin, Markus Pauli (Advanced Cyclotron Systems Inc.)

Linac Production of Cu-67: Design, Production, and Separation
David A. Rotsch, David A. Ehst, Nicholas A. Smith, Vahko Makarashvili, Andrew S. Hebden (ANL)

Production of High Specific Activity $^{186}$Re for Cancer Therapy Using WO$_3$ Targets in a Proton Beam

Isotope Production and Clinical Research at the University of Washington Clinical Cyclotron
Eric Dorman, Robert Emery, (Univ of Washington School of Medicine)

REFERENCE MATERIALS FOR NUCLEAR MASS PECTROMETRY/NUCLEAR ANALYSIS SESSION TO THE HONOUR OF DR. STEFAN BUERGER
Session Organizers: Stephan Richter (EC JRC), Jacqueline L. Mann (NIST)
Cochairs: Stephan Richter (EC-JRC), Jacqueline Mann (NIST)

To the Memory of Stefan Buerger
Sergei Boulyga (IAEA), invited

Implementation of MC-ICP-MS for Bulk Analysis of Environmental Samples at IAEA Safeguards Analytical Laboratories
Sergei Boulyga, Andreas Koepf, Zsuzsanna Macsik (IAEA), invited

New Uranium Isotopic Synthetic Calibration Mixes and Recertification of NBL U-Series CRMS
Rebecca B. Thomas, Richard Essex, Colleen Gradle (DOE–New Brunswick Lab), invited

Recently Certified Reference Materials from New Brunswick Laboratory
Kattathu J. Matthew, Richard Essex, Colleen Gradle (DOE–New Brunswick Lab), invited

Certification of Uranium Hexafluoride Reference Materials for Isotopic Composition

Reference Materials for Nuclear Forensics
Jacqueline Mann (NIST), Richard Essex, Paul Croatto (New Brunswick Lab), Jeffrey Morrison (U.S. Department of Homeland Security)

Reference Materials for Pu-238 Determination in Plutonium by Thermal Ionisation Mass
Spectrometry
Suresh K. Aggarwal, D. Alamelu (BARC)

Preparation of High Purity Isotopic Reference Standards for Isotope Dilution Mass Spectrometry

Monday, August 25, 2014, 3:30 P.M.-6:30 P.M.

REACTOR-BASED PRODUCTION OF Mo-99—II
Session Organizers: Natesan Ramamoorthy (HBNI), James S. Welsh (NIU Inst for Neutron Therapy)
Cochairs: James Welsh (NIU), Rostislav Kuznetsov (JSC "SSC RIAR")

Scope and Need for Reducing Over-Dependence on Fission-Based Mo-99/Tc-99m: An Analysis
N. Ramamoorthy (BARC), invited

ANSTO Nuclear Medicine—Towards a Stable Supply of Mo-99
Michael Druce, Mark Moore (ANSTO)

LEU-Based Fission Mo-99 Process with Facile Solid Wastes
Seung-Kon Lee, Suseung Lee, Sung-Hee Jung, Soon-Bog Hong, Kyung-Duk Jang, Sang Mu Choi, Jun Sig Lee, In-Cheol Lim (KAERI)

Mo-99 Production in RIAR: Status and Conversion Planning

Dynamic System Simulation of Fissile Solution Systems
Robert Kimpland, Steven Klein (LANL)

Nuclear Design of the KIJANG Research Reactor for Radio-Isotope Production and Silicon Doping
Hong-Chul Kim, Chul Gyo Seo, Hee Taek Chae (KAERI)

THERAGNOSTICS/PERSONALIZED MEDICINE
Session Organizers: Flavia Groppi (LASA), Suresh Srivastava (BNL)
Cochairs: Suresh Srivastava (BNL), Jean-Louis Alberini (Institut Curie)

Theragnostic Radiopharmaceuticals for the Imaging Plus Treatment of Cancer and Other Inflammatory Disease
Suresh C. Srivastava (BNL), Nigel R. Stevenson (Clear Vascular, Inc.), invited

Multifunctional Radionanomedicine: A New Theranostic Approach
F. Groppi, M.L. Bonardi, S. Manenti, L. Gini (Università degli Studi di Milano & INFN), E. Sabbioni (ECSIN Veneto Nanotech), invited

New Radioisotopes for Innovative Theranostic Approach in Nuclear Medicine
Mickaël Bourgeois (Arronax Cyclotron/CRCNA/CHU Nantes), Mathieu Frindel (CRCNA/CHU Nantes),
Ferid Haddad (Arronax Cyclotron), Michel Cherel (CRCNA), Jacques Barbet (Arronax Cyclotron), Alain Faiivre-Chauvet (CRCNA/CHU Nantes), invited

**Preliminary Production of Ac-225 by Spallation Reaction on Th-232**
Leonard F. Mausner, Dmitri G. Medvedev (BNL), David Denton, John Cosgrove, Saed Mirzadeh (ORNL), Albert L. Hanson (BNL), invited

**Low Energy Proton Irradiation of $^{86}$SRCL$_2$ at BLIP to Produce Radioisotope Y-86**
Dmitri G. Medvedev, Leonard F. Mausner (BNL), invited

**Deuteron Beams to Produce Radionuclides for Theranostic Medicine Applications**
M. L. Bonardi, S. Manenti, L. Gini, F. Groppi (Università degli Studi di Milano & INFN)

**The Theragnostic Radionuclide Pair: $^{64}$Cu/$^{67}$Cu at Arronax Cyclotron**
Nathalie Michel (GIP Arronax/Univ of Nantes), Gaia Pupillo (Univ and IFN of Ferrara), Thomas Sounalet (GIP Arronax/Univ of Nantes), Cyrille Alliot (Univ of Nantes), Mauro Gambaccini (University and INFN of Ferrara), Ferid Haddad (GIP Arronax/Univ of Nantes)

**Nucleophilic F-18 Fluorination for Bioconjugation Chemistry: Its Applications to Imaging Agents**
Dae Yoon Chi (Sogang Univ), Byoung Se Lee (FutureChem Co., Ltd.), Hyejin Ahn, Byungsoo Kang (Sogang Univ), invited

**APPLICATION OF NUCLEAR TECHNIQUES TO NATIONAL SECURITY AND TREATY MONITORING**
Session Organizers: Kenan Unlu (Penn State), Igor Jovanovich (Penn State)
Cochairs: Kenan Unlu (Penn State Univ), Igor Jovanovich (Penn State Univ)

**Cyclic Neutron Activation Analysis of Actinides for Material Characterization**
Bruce D. Pierson, Marek Flaska, Sara A. Pozzi (Univ of Michigan)

**Material Characterization to Support a National Nuclear Forensics Library**
Stephen LaMont, Marcia Brisson, Heather Dion, Ed Fei (DOE), Michael Kristo, Ian Hutcheon (LLNL), Lav Tandon, Robert Steiner (LANL), John Wacker, Andy Luksic (PNNL)

**Environmental Cesium Isotope Ratio Measurements: Nuclear Forensic Applications**
Darin C. Snyder, Nick Mann, Mathew Snow (INL)

**Evaluating Polymer Ligand Film (PLF) for Plutonium and Uranium Extraction in Nuclear Forensics Application**
Jung H. Rim (Penn State Univ/LANL), Dominic Peterson, Claudine Armenta, Edward Gonzales (LANL), Kenan Unlu (Penn State Univ)

**Hot Particle Analysis Using Nondestructive Autoradiography, Nuclear Counting and Microanalysis for Low-Level Activity**
C. J. Zeissler, S. Turner, R. M. Lindstrom, J. Davis (NIST)

**Standoff Enrichment Measurements Using Filamentation Laser-Induced Breakdown Spectroscopy**
Igor Jovanovic, Kyle Hartig, Phyllis Ko (Penn State Univ), invited

**Ultra-Sensitive Isotope Ratio Measurements Using Laser Photoionization of Sputtered Atoms**
ISOTOPE DEVICES, ISOTOPE TRACERS AND OTHER APPLICATIONS
Session Organizer: Rolf Zeisler (NIST)
Co-chairs: Justin Walenski (Univ of Missouri, Columbia), Jefferson Vianna Bandeira (Brazilian Nuclear Energy Commission)

Protective Effects of Active Compound from Ginger Against Radiation-Induced Cell Damage
Jin Kyu Kim, S. M. Nasir Uddin, Dong-Min Chung, Jin-Hong Kim (KAERI)

Target Design and Qualification for Plutonium-238 Production

Preparative Scale Separation of Ethyl Esters of Diethylenetriaminepentaacetic Acid by Flash Chromatography
Jonathan Fitzsimmons (BNL), Michael Jay (Univ of North Carolina)

Improvement of Betavoltaic Isotope Battery
Guanquan Wang, Hongyuan Wei, Yuqing Yang, Rui Hu, Yebing Liu, Shunzhong Luo (China Academy of Engineering Physics)

Progress in Development of Low Energy Nuclear Reaction (LENR) Power Cells for Space Applications
George H. Miley, Kyu-Jung Kim, Tapan Patel, Bert Stunkard (Univ of Illinois), invited

C Isotopes in Soil and Pollen in Lake Sediment, Southeastern Brazil: Atlantic—Amazon Forest Ancient Dynamics and Connections
L. C. R. Pessenda, A. A. Buso, Jr., P. E. De Oliveira, P. C. Giannini (USP), M. C. L. Cohen (UFPA), F. L. Lorente, M. F. Correia (USP), invited

Nutrients and Trace Elements in Six Sugarcane Varieties Measured by Instrumental Neutron Activation Analysis
M. I. Martinez, E. A. De Nadai Fernandes, M. A. Bacchi, G. A. Sarriés (USP)

QUALITY ASSURANCE TOPICS IN RADIOANALYTICAL AND RADIOPHARMACEUTICAL CHEMISTRY
Session Organizers: Simon Mark Jerome (National Physical Lab), Sally Schwarz (Washington Univ)
Cochairs: Simon Jerome (NPL), Sally Schwarz (Washington Univ School of Medicine)

Use of IAEA Reference Materials for QA in Analytical Techniques and Applications to Environmental Sample Analysis
A. Ceccatelli, A. Fajgelj, M. Groening, S. Tarjan, A. R. Iurian, A. Pitois (IAEA), invited

Quality Control of the Radiopharmaceutical Precursors ItraPol (\(^{90}\text{YCl}_3\)) and LutaPol (\(^{177}\text{LuCl}_3\)) Produced at POLATOM
Piotr Garnusek, Alina Markiewicz, Dariusz Pawlak, Anna Filiks, Iwona Sasinowska, Tomasz Dziel, Michal Korytkowski, Renata Mikolajczak (POLATOM)

Quality Control of Reactor Produced Radioisotopes at MURR
Cathy S. Cutler, Leonard Manson, Jack Lydon, Mike Flagg (Univ of Missouri, Columbia), invited

Research vs cGMP Manufacture—Challenges and Opportunities
Suzanne V. Smith, Jean Odin McCabe (BNL), invited

Tuesday, August 26, 2014, 8:00 A.M.

MARIE CURIE COMMEMORATIVE SESSION
Session Organizer: Paul T. Dickman (ANL), Rolf Zeisler (NIST), Stephen P. LaMont (LANL)
Chair: Paul Dickman (ANL)

Radium: From Discovery by Marie Curie to Medical Applications
Jean-Louis Alberini (Curie Inst), invited

The Role of Periodic Tables in the Discovery of New Chemical Elements
Darleane C. Hoffman (Univ of California/Berkeley/LBNL), invited

Tuesday, August 26, 2014, 10:10 a.m.

MARIE CURIE PLENARY SESSION
Session Organizers: Paul T. Dickman (ANL), Rolf Zeisler (NIST), Stephen P. LaMont (LANL)
Cochairs: Janice Dunn-Lee (IAEA), Sue Clark (Washington State Univ, Pullman)

Applications of Positron Annihilation Techniques
Ilham Y. Al-Qaradawi, D. A. Abdulmalik (Qatar Univ), invited

Rapid Radiotracer Chemistry and Imaging the Human Brain
Joanna S. Fowler (BNL), invited

Cyclotron Production and Imaging Applications of Positron Emitting Radiometals
Suzanne E. Lapi (Washington Univ), invited

Current Directions in Diagnostic and Therapeutic Radiopharmaceuticals
Tuesday, August 26, 2014, 1:00 P.M.-3:00 P.M.

POSTER DISCUSSION A

ISOTOPE PRODUCTION IN REACTORS

A1 Capabilities of the LVR-15 Research Reactor for Production of Medical and Industrial Radioisotopes
Michal Koléška, Jaroslav Ernest, Zdena Lahodova, Ladislav Viererbl, Miroslav Vins, Jaroslav Šoltes, Josef Stehno (Centrum výzkumu Řež)

A2 Development of the Automated Control System Supporting Production of Radionuclides for Medical Applications
S. G. Novikov, A.V. Berintsev, A. E. Kondratyev, D. V. Kozlov, A. B. Muralev (Ulyanovsk State Univ), R. A. Kuznetsov, V. A. Tarasov (JSC "SSC RIAR"), V. V. Svetukhin, A. V. Zhukov (Ulyanovsk State Univ)

A3 Production of Iodine-131 by Irradiating Tellurium Dioxide at JSC “SSC RIAR”
L. L. Kazakov, R. A. Kuznetsov, A. V. Kupriyanov, E. G. Romanov, V. A. Tarasov, D. G. Rybin, S. A. Sazontov, V. A. Uzikov (JSC "SSC RIAR")

A4 New Version of ORIP_XXI Software to Analyze the Data on Isotopes
E. G. Romanov, V. A. Tarasov (JSC “SSC RIAR”)

A5 Development of Silver-Exchanged Adsorbents for the Removal of Fission Iodine from Alkaline Dissolution
Seung-Kon Lee, Suseung Lee, Ul Jae Park, Kwon Mo Yoo, Kang Hyuk Choi, Jun Sig Lee (KAERI)

A6 Development of Aluminum Waste Treatment Process for Applying to Fission Mo-99 Production
Suseung Lee, Seung-Kon Lee, Sung-Hee Jung, Soon-Bog Hong, Kyung-Duk Jang, Sang Mu Choi, Jun Sig Lee, In-Cheol Lim (KAERI)

A7 Development of the Adsorbent for Gaseous Iodine Treatment for Applying to Fission Mo-99 Production
Suseung Lee, Seung-Kon Lee, Yong Bae Park, Ul Jae Park, Kwon Mo Yoo, Kang Hyuk Choi, Jun Sig Lee (KAERI)

A8 Studying of the Carrier-Free $^{177}$Lu Radioisotope Production Methods in NRC “Kurchatov Institute”
P. Boldirev, D. Chuvilin (NRC "Kurchatov Inst"), S. Deev, V. Golovachenko (RAS), D. Markovskiy, R. Nurtdinov, M. Proshin, A. Semenov, Y. Vereshagin, V. Zagryadskiy, A. Zaharov (NRC "Kurchatov Inst"), invited
A9 Development of High Specific Activity $^{99}$Mo Radioisotope Production Method in Radiative Absorption Reaction $^{99}$Mo(n,γ)$^{99}$Mo Using Structured Molybdenum-Containing Nanoparticles as Target Material


A10 Development and Scaling of n-GAMMA Mo-99 Production at MURR

Leonard Manson, Jack Lydon, Ralph Butler, Mike Flagg (Univ of Missouri, Columbia)


Lize Stassen, Janine Suthiram (Necsa)

ISOTOPE PRODUCTION AND OUTPUT ANALYTIC CONTROL AND QUALITY SYSTEMS

A12 Overview of New Uranium Isotopic Reference Materials at IRMM

Stephan Richter, Sebastien Mialle, Jan Truyens, Roger Eykens, Ulf Jacobsson, Yetunde Aregbe (IRMM-JRC-EU)

A13 Plutonium Age Dating for Nuclear Forensics: A Close-Up on the Pu/U Chronometers

M. Sturm (Univ of Natural Resources and Life Sciences Vienna), S. Richter, Y. Aregbe, R. Wellum, K. Mayer (EC JRC), T. Prohaska (Univ of Natural Resources and Life Sciences Vienna)

A14 IRMM-1000 and REIMEP-22: A Certified Reference Material and an Interlaboratory Comparison on U/TH Age Dating for Nuclear Forensics

Celia Venchiarutti, Stephan Richter (EC-JRC), Zsolt Varga (ITU), Rozle Jakopic (EC-JRC), Klaus Mayer (ITU), Yetunde Aregbe (EC-JRC)

A15 Excitation Function Measurements for TC-99m Production by Proton Beams Irradiation—The Italian Contribution

S. Manenti, L. Gini, Flavia Groppi (Università degli Studi di Milano & INFN)

A16 Terminology on the Concepts of Carrier, Specific Activity, Activity Concentration and Purities in Nuclear and Radiochemistry, Radioanalytical and Radiopharmaceutical Chemistry

Mauro Bonardi (Università degli Studi di Milano)

ACCELERATOR PRODUCED ISOTOPES

A17 Computational Fluid Dynamics Simulation of Uranium Aqueous Solution for Mo-99 Production

Jason Oakley, Geoffrey Bull, Michael Corradini (Univ of Wisconsin, Madison), Eric Van Abel (Shine Medical Technologies)

A18 Radiation Safety in PET Isotope Work: A Resource not a Restriction

Kinda Abdi, Daniel Szatkowski (Washington Univ), Susan M. Langhorst (Washington Univ/Mallinckrodt Inst of Radiology)

A19 Accelerator-Based Production of $^{99}$Mo: A Comparison Between the $^{100}$Mo(p,x) and $^{96}$Zr(α,n) Reactions

Gaia Pupillo (Dipartimento di Fisica e Scienze della Terra and INFN of Ferrara), Juan Esposito
A20 Radiation Safety in PET Isotope Work: Resource Tools
Kinda Abdin, Daniel Szatkowski (Washington Univ), Susan M. Langhorst (Washington Univ/Mallinckrodt Inst of Radiology) 107

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Paul A. Ellison, Todd E. Barnhart, Robert J. Nickles (Univ of Wisconsin, Madison), Jeff Driscoll (Shine Medical Technologies, Inc.), Onofre T. DeJesus (Univ of Wisconsin, Madison) 112

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Jonathan M. Fitzsimmons, Leonard F. Mausner (BNL) 113

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E. Bodnar (Trauma Risk Management Research Inst), E. Medvedeva (Kharkov Inst of Physics and Technology) 114

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Dariusz Pawlak, Jozef L. Parus, Wioletta Wojdowska, Renata Mikolajczak (POLATOM) 115

A29 Study on the Development of Safe Decommissioning Procedures for Medical Isotope Production Cyclotron in Rep.of Korea
Yongmin Kim, Rina Woo, Dayoung Kwon (Catholic Univ of Daegu), Minchul Song, Woonkap Cho (KINS) 116

PRODUCTION OF STABLE ISOTOPES

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Carlos R. Sant Ana Filho, Alexssandra L. M. R. Rossete, João J. M. Milagres, Clelber V. Prestes, Eduardo Ferriolli, José A. Bendassolli (Univ of São Paulo) 117
# ISOTOPE DEVICES, ISOTOPE TRACERS, AND OTHER APPLICATIONS

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# ISOTOPE TRACERS

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ACCELERATOR-BASED PRODUCTION OF Mo-99
Session Organizers: Thomas Ruth (TRIUMF), George F. Vandergrift III (ANL)
Cochairs: Thomas Ruth (TRIUMF), Henri Bonet (IRE, retired)

Update on the University of Alberta’s TR24 Production of $^{99m}$TC
K. Gagnon, J. Andersson, B. Thomas, J. Wilson, J. Doupe, S. A. McQuarrie, A. J. B. McEwan (Univ of Alberta), invited

Current is King: The Direct Production of $^{99m}$TC Via the $^{100}$MO(P,2N) Channel on Small Medical Cyclotrons
K. Buckley (TRIUMF), T. J. Ruth (TRIUMF/BC Cancer Agency), F. Bénard (BC Cancer Agency), M. Kovacs (Lawson Health Research Inst), A. Celler (Univ of British Columbia), V. Hanemaayer, B. Hook, S. McDiarmid, S. Zeisler (TRIUMF), J. Corsaut (Lawson Health Research Inst), C. Economou (Centre for Probe Development and Commercialization), J. Klug (BC Cancer Agency), R. Harper (Centre for Probe Development and Commercialization), M. Vuckovic (BC Cancer Agency), J. Valliant (Centre for Probe Development and Commercialization), P. Schaffer (TRIUMF), invited

Target Materials for Accelerator Production of TC-99M
Vernal Richards, Efrem Mebrahtu, Tara Mastren, Suzanne E. Lapi (Washington Univ), invited

Safety Regulation of Medical Isotope Production Accelerators in Canada
Kavita Murthy (Canadian Nucl Safety Comm)

Supplying Alternative Mo-99/Tc-99m Production: Availability of Mo-100/Mo-98
P. E. Hardy (ISOFLEX USA), G. M. Skorynin, S. V. Filimonov, A. N. Gilev, G. V. Kolygaeva (JSC), invited

Accelerator Production of Mo-99 Utilizing Electron Accelerators
James T. Harvey (NorthStar Medical Technologies, LLC), invited

Development of Photon-Based Accelerator Production as a Viable Route to Large-Scale Supply of MO-99/TC-99m in Canada
Kennedy Mang’era (Univ of Manitoba), invited

Recent Progress in the Design and Experimental Activities Supporting the Commercial Electron Accelerator Production of the Medical Radioisotope Mo-99
Radiation Protection Consideration during Construction, Commissioning and Production of Mo-99 with a 40 kW 35 MeV Electron Linac at the Canadian Light Source
Pradyot Chowdhury (Canadian Light Source Inc.), invited

APPLICATIONS IN NUCLEAR MEDICINE—DIAGNOSTICS
Session Organizers: Cathy Sue Cutler (Univ of Missouri), Buck Rogers (Washington Univ)
Cochairs: Buck Rogers (Washington Univ, St. Louis), Joanna Fowler (BNL, retired)

Radiometal-Based Immunopet Imaging of Cancer
Hao Hong, WeiBo Cai (Univ of Wisconsin, Madison), invited

44mSc/44Sc in Vivo Generator: First Experience of Vector Radiolabeling and Biological Evaluation for Radiopharmaceutical Development
S. Huclier-Markai (Univ of Nantes/Arronax GIP) C. Alliot (Arronax GIP/CRCNA), J. Rousseau, N. Chouin (AMAROC/ONIRIS), M. Mougin-Degraef (CRCNA-Inserm), M. Fani (Univ Hospital of Basel), P. Bouziotis, T. Maina (NCSR Demokritos), C. S. Cutter (Univ of Missouri, Columbia), J. Barbet (Arronax GIP/CRCNA), invited

The Site-Specific Radiolabeling of Antibodies on the Heavy Chain Glycans
Brian M. Zeglis, Charles B. Davis (Memorial Sloan-Kettering Cancer Center), Robert Aggeler (Life Technologies), Pier Selenica (Memorial Sloan-Kettering Cancer Center), Hee Chol Kang, Aimei Chen, Brian J. Agnew (Life Technologies), Jason S. Lewis (Memorial Sloan-Kettering Cancer Center), invited

Diagnostic Imaging with 68Ga-Biophosphonates vs. Treatment of Bone Metastases with 177Lu-Analogues
Marian Meckel (Univ of Mainz), Voitech Kubicek, Petr Herrman (Charles Univ in Prague), Ralf Bergmann, Jens Pietsch, Joerg Steinbach (HZDR), C. S. Bal (AIIMS), Richard Baum (Theranostics), Frank Roesch (Univ of Mainz), invited

Development of Metrology Tools for Enhancing the Quantitative Value of Positron Emission Tomography
Brian E. Zimmerman, Denis E. Bergeron, Jeffrey T. Cessna, Ryan Fitzgerald, Matthew M. Mille, Leticia Pibida (NIST), invited

New SPECT Tracers in the Era of PET: Nice to Have or Need to Have?
Roger Schibli (Paul Scherrer Inst), invited

Imaging Lung Function Using Hyperpolarized 3He
Stephen Kadlecek, Hooman Hamedani, Yi Xin, Rahim Rizi (Univ of Pennsylvania), invited

Custom Labeling and Evaluation of Proteins with Zr-89
Jason A. Rogers, Druce K. Crump, Jaime Simón, Scot H. Ellebracht (IsoTherapeutics Group LLC), Christopher M. Bull, John L. Chunta (Molecular Imaging, Inc.), Lori Murray (PerkinElmer, Inc.)

RADIOPHARMACEUTICAL CHEMISTRY
Session Organizer: Meera Venkatesh (IAEA)
Cochairs: Meera Venkatesh (IAEA), Jim Simon (IsoTherapeutics)

Which Will be the Workhorse Radionuclide of Future Diagnostic Nuclear Medicine?
Adriano Duatti (Univ of Ferrara), invited

**Validation of HCl-EtOH-Method for Preconcentration of $^{68}$Ge/ $^{68}$Ga Generator Eluate and Study of the Sorption-Desorption Mechanism**
A. A. Larenkov, E. I. Lesik, T. A. Khaustova, A. B. Bruskin (Burnasyan FMBC), Ya. V. Zubavichus (Kurchatov Inst), G. E. Kodina (Burnasyan FMBC), invited

**Iodinated GRP-OPE Conjugate and in Vitro Properties**
Zhijun Zhou, Hongyuan Wei, Guanquan Wang (China Academy of Engineering Physics)

**REACTOR PRODUCTION OF MEDICAL ISOTOPES**
Session Organizers: Natesan Ramamoorthy (Homi Bhabha National Inst), Cathy Cutler (Univ of Missouri)
Cochairs: Cathy Cutler (Univ of Missouri, Columbia), Bernard Ponsard (SCK-CEN - BR2 Reactor)

**The Necessity of Research Reactors for Radioisotope Production**
Bernard J. Ponsard (SCK.CEN/ BR2 Reactor), invited

**Novel Radionuclide Production at POLATOM**
Renata Mikolajczak (POLATOM), invited

**Production of Radioisotopes at the Jules Horowitz Reactor**
Jean-Pierre Coulon (CEA), invited

**Reactor Isotope Production at MURR**
Cathy S. Cutler (Univ of Missouri), invited

**Production of High Specific Activity of $^{153}$Sm by Isotope Separation Following Neutron Irradiation**
John M. Dauria, Keith Frank (Isotherapeutics Group, LLC), Alan Ketting (Missouri Univ Research Reactor), Keith Ladouceur (Advanced Applied Physics Solutions), Suzanne E. Lapi (Washington Univ), Thomas J. Ruth (TRIUMF), Paul Schmor (Schmor Particle Accelerator Consulting, Inc.), Daniel W. Stracener (ORNL), Jaime Simon (Isotherapeutics Group, LLC)

**Experimental Validation for Optimization of Transcurium Isotope Production**
Susan Hogle, Charles W. Alexander, Jonathan D. Burns, Julie G. Ezold (ORNL)

**Radiochemical Isolation of the Therapeutic $^{195m}$Pt from the Neutron Irradiated $^{193}$Ir Metal**

**Production of Transplutonium Elements at JSC “SSC RIAR”**
Yu. G. Toporov, E. V. Shimbarev, V. A. Tarasov, E. G. Romanov, A. V. Kupriyanov (JSC “SSC RIAR”)

**Calculation of the Specific Activity of $^{177}$Lu**
Otto Knoesen, Steven Maage (NTP Radioisotopes SOC Ltd)

**Research Reactor Production and Purification of $^{64}$Cu and $^{67}$Cu Using Enriched Zinc Isotopes**
Amanda M. Johnsen, Brenden J. Heidrich, Chad B. Durrant, Andrew J. Bascom, Kenan Ünlü (Penn State)
Sr-89 Production Using Reactors of JSC “SSC RIAR”  

PRODUCTION OF STABLE ISOTOPES  
Session Organizer: Wolfgang H. Runde (LANL)  
Cochairs: Wolfgang Runde (LANL), Darren Brown (Trace Sciences International Corp)

Isotope Production at Oak Ridge National Laboratory  
John W. Krueger (ORNL), invited

Production Capacities of ROSATOM State Corporation’s Isotope Complex in the Sphere of Stable Isotopes’ Manufacturing and Supplies  
Aleksey Vakulenko (JSC Isotope)

Development of Electromagnetic and Gas Centrifuge Technologies for the Enrichment of Stable Isotopes  
Brian J. Egle, Kevin J. Hart, William D. Strunk, Gary E. Giles (ORNL), invited

Demonstration of Magnetically-Activated and Guided Isotope Separation (MAGIS)  
Mark G. Raizen (Univ of Texas, Austin)

Multicomponent Separation Potential: Back to the DIRAC  
O. E. Aleksandrov, V. M. Gadelshin, V. A. Palkin, V. D. Seleznev (Ural Federal Univ)

STABLE ISOTOPES IN MATERIALS AND ENVIRONMENTAL RESEARCH  
Session Organizer: Robert Gregory Downing (NIST)  
Cochairs: Tor Bjørnstad (Institute for Energy Technology), Raymond Cao (Ohio State Univ)

A Time-Dependent Picture of Hydration Layer Evolution During Glass Corrosion via Isotopic Tracing Mechanisms  

Iodine Valence and Local Environment in Nuclear Waste Glass Characterized by X-Ray Absorption Spectroscopy  
David A. McKeown, Isabelle S. Muller, Ian L. Pegg (Catholic Univ of America)

Local Time-Averaged Gas Holdup in Fluidized Bed Reactor Using Gamma Ray Computed Tomography Technique (CT)  
Abdelsalam Efhaima, Muthanna H. Al-Dahhan (Missouri Univ of Science and Technology)

Identifying and Analyzing Species of Pollens in Taiwan by Isotope Ratio Mass Spectrometer  
Wen-Chi Wang, Chien-Cheng Jung, Chuan-Pin Lee, Ming-Chee Wu, Huey-Jen Su (Cheng Kung Univ)

NUCLEAR DATA FOR MEDICAL ISOTOPES  
Session Organizers: Syed M. Qaim (FzJ), Philip L. Cole (Idaho State Univ)  
Cochairs: Syed Qaim (Research Centre Jülich), Elena Bodnar (ANL)
Predicting Medical Isotope Production with TALYS: The Case of $^{99m}$TC
A. J. Koning (NRG), invited

New Developments in the Experimental Data for Charged Particle Production of Medical Radioisotopes
Ferenc Ditroi, Ferenc Tárkányi, Sándor Takács (Hungarian Academy of Sciences), Alex Hermanne (Vrije Universiteit Brussel), invited

Paucity of Photonuclear Data for the Accelerator-Based Production of Isotopes
Valeria N. Starovoitova, Terry L. Grimm (Niowave Inc.), Philip L. Cole (Idaho State Univ), invited

New Measurements for Proton and Deuteron Beam Monitor Reactions
Arnaud Guertin, Charlotte Duchemin (SUBATECH/CNRS/IN2P3), Eric Garrido (SUBATECH/CNRS/IN2P3/IN2P3), Ferid Haddad (SUBATECH/CNRS/IN2P3/GIP Arronax), Vincent Metivier (SUBATECH/CNRS/IN2P3), Nathalie Michel (SUBATECH/CNRS/IN2P3/GIP Arronax)

Excitation Function Measurements for PD-103 Production by Deuteron Beams Irradiation
S. Manenti, M. L. Bonardi, L. Gini, F. Groppi (Università degli Studi di Milano & INFN)

ENVIRONMENTAL FATE AND IDENTIFICATION OF RADIONUCLIDES
Session Organizers: Timothy E. Payne (ANSTO), Stacey L. Lance (Univ of Georgia)
Cochairs: Timothy Payne (ANSTO), Stacey Lance (Univ of Georgia)

Ultra-Sensitive Nuclear Measurements of Environmental Radioisotopes
Craig E. Aalseth, Jill M. Brandenberger, Matthew Douglas, James E. Fast, Gary A. Gill, James J. Moran, Robert C. Runkle (PNNL), invited

Assessment of Naturally Occurring Radioactive Materials (NORM) In Mission, Texas Surface Soils
Mohammad Hannan, Nam Nguyen, Kareem Wahid (Univ of Texas–Pan American)

Technetium Behavior in Nuclear Waste Vitrification Processes
Ian L. Pegg (The Catholic Univ of America), invited

Using Chemical and Isotopic "Signatures" to Resolve Multiple Contamination Sources in the Environment
Sue B. Clark (Washington State Univ), invited

Wednesday, August 27, 2014, 8:00 A.M.

ISOTOPE RESEARCH PLENARY
Session Organizers: Paul T. Dickman (ANL), Rolf Zeisler (NIST), Stephen P. LaMont (LANL)
Cochairs: Heinz Gaeggeler (Paul Scherrer Inst.), Thomas F. Wall (LBL)

Nuclear Data for Medical Radionuclides
Syed M. Qaim (FzJ), invited

Targeted Alpha Therapy with $^{225}$Ac and $^{213}$Bi
Frederik Giesel (University Heidelberg), Alfred Morgenstern, Frank Bruchertseifer, Christos Apostolidis (Univ of Heidelberg), invited

**Radiometric Fluxomics: A New Era for Quantitative Plant Biology**
Richard A. Ferrieri (BNL), invited

**For the Sake of Security: Incentivizing Alternatives to High-Risk Radiological Sources**
Miles A Pomper (James Martin Center for Nonproliferation Studies), invited

**Wednesday, August 27, 2014, 10:10 A.M.**

**WCI PRESIDENT’S FORUM**


Session Organizer: Paul T. Dickman (ANL)
Cochairs: Myung-Chul Lee Kim (Seoul National Univ), Wessel Van Zyl de Villers (IAEA)

**Importance of the Government’s Role on the Establishment of RI Supply Chain**
Jong Kyung Kim (KAERI)

**Wednesday, August 27, 2014, 1:00 P.M.-3:00 P.M.**

**POSTER PRESENTATION B**

**RADIOECOLOGY, RADIOACTIVE WASTE, AND ENVIRONMENTAL METHODS**

**B1 The Design of a Remote Radiation Monitoring System in Water Based on a Silicon Photomultiplier**
H. M. Park, K. S. Joo, M. K. Park, S. H. Baeck (Myongji Univ)

**B2 The Standardization of 241Pu Samples by 2pα-Counting and Precision Gamma-Spectrometry Methods**
I. Alekseev, T. Kuzmina (V.G. Khlopin Radium Inst)

**B3 Samarium Determination by Neutron Activation Analysis in Uranium-Rich Samples**
I. S. Ribeiro, Jr., M. Saiki, F. A. Genezini, G. S. Zahn (Instituto de Pesquisa Energéticos e Nucleares)

**B4 Analyzing Emission Spectra Induced by a Transmission-Type X-Ray Tube with Respect to Target Thickness and Material Using Monte Carlo Simulation**

**B5 Investigation of Polonium (IV) Complexation Properties**
B6 Radioisotope Content of Coal and Coal Ash of Power Stations in Mongolian Capital City and its Distribution in Environment
Nanzad Norov (Univ of Mongolia), Tseren Davaadorj, Nyamjav Enkhtsogt, Namsraidav Altangerel (Radiation Safety and Nuclear Technology Association of Mongolia)

B7 Radionuclide Bioaccumulation in Trees at an Australian Legacy Low-Level Waste Site: Concentration Patterns in Branches and Foliage

B8 Beam Hardening Artifact: Cause and Correction Techniques
Zhihong Wu, Peng Cong, Ximing Liu (Tsinghua Univ)

B9 A Novel Radionuclide Specific Detector System for the Measurement of Radioactivity at Steel Works
E. Garcia-Torano, V. Peyres, B. Caro, M. Roteta, (CIEMAT), D. Arnold, O. Burda (PTB), M-R Ioan (IFIN-HH)

B10 Control of Radionuclide Contamination by Using Aquatic Macrophytes
N. Dikiy, A. Dovbnya, Yu. Lyashko, E. Medvedeva (KIPT)

B11 Structural and Transport Characteristics of UC I3 and CeCl3 Molten LiCl-KCl Mixture: A Molecular Dynamics Simulation Study
Tao Jiang, Ning Wang, Shuming Peng (China Academy of Engineering Physics), Liuming Yan (Shanghai Univ)

NUCLEAR FORENSICS

B12 Abatement of Xenon and Iodine Emissions from Medical Isotope Production Facilities
Charles G. Doll, Christina M. Sorensen, Theodore W. Bowyer, Judah I. Friese, James C. Hayes (PNNL), Emmy Hoffmann (ANSTO), Rosara Kephart (Air Force Technical Applications Center)

B13 Production of 236Np and 236Pu for Isotope Dilution Mass Spectrometry

B14 International Sealed Source Database: A Radiological Forensics Signature Library
Jodi Canaday, David Chamberlain (ANL), Martha Finck (INL), Yu Tang, Seema Naik (ANL), Kevin Carney (INL)

B15 Cosmic-Ray Induced Production of Radioactive Noble Gases in the Atmosphere
Ground, and Seawater, William H. Wilson, Steven Biegalski, Christine Johnson (Univ of Texas, Austin), Derek Haas, Justin Lowrey (PNNL)

B16 14 MEV Neutron Irradiation Facility with an Automated Fast Cyclic Pneumatic System
Matthew T. Montgomery, Michael D. Yoho, Steven R. Biegalski, Sheldon Landsberger (Univ of Texas, Austin)
B17 UTEX Simulation of Tracer Gas Experiment
Justin D. Lowrey, Khris B. Olsen, Derek A. Haas, Amanda M. Prinke, Michael P. Foxe (PNNL)

RESEARCH

B18 Preparation of Purified $^{85}$Sr Using No-Carrier-Added Technique
S. Yano, Y. Wakitani, T. Yamada (Japan Radioisotope Association), J. Kanaya, S. Shibata, K. Takahashi, H. Haba (RIKEN)

B19 Direction Tracking of Environmental Radiation Monitoring System
J. H. Park (MyongJi Univ/Realgain Inc.), H. M. Park, K. S. Joo (MyongJi Univ)

B20 Target Material for Synthesis of Element 117
M. A. Ryabinin, E. A. Yerin, R. A. Kuznetsov (JSC “SSC RIAR”)

B21 Synthesis, Crystal Structure and Spectroscopic Properties of $[\text{TcO}_2(\text{Im})_4]\text{Br} \cdot 2\text{H}_2\text{O}$
A. Ya. Maruk, M. S. Grigoriev, A. M. Fedoseev (RAS), K. Czerwinski, F. Poineau (UNLV), K. E. German (RAS/Moscow Medical Inst), invited

B22 Development of High-Density Targets for Mo-99 with Using Atomized U Metal Powder
Yong Jin Jeong, Jong Man Park, Kyu Hong Lee, Ki Nam Kim, Sung Hwan Kim (KAERI)

MEDICINE

B23 A Study on the Synthesis of $^{45}$Sc-HBED-CC
Pyeong-Seok Choi (Dongguk Univ), Jung-Hoon Park (KAERI), Sang Wook Kim (Dongguk Univ)

B24 Comparison of Fungal Cell Susceptibility to External Alpha Particle Beam Radiation Versus Alpha Particles Delivered by 213-Bismuth-Labeled Antibody
Ruth Bryan (Albert Einstein Coll of Medicine), Igor Shuryak (Columbia Univ), Alfred Morgenstern, Frank Bruchertseifer (EC JRC ), Stephen Marino (Columbia Univ), Ekaterina Dadachova (Albert Einstein Coll of Medicine/EC JRC)

B25 Synthesis and Evaluation of Surface Modified Folate Immobilized Silic-$^{198}$Au Nanocomposites
Jeong Hoon Park (KAERI), Jun Young Lee (KAERI/Dongguk Univ), Min Goo Hur, Seung Dae Yang (KAERI), Kook Hyun Yu, Sang Wook Kim (Dongguk Univ)

B26 Radiosynthesis and Comparison of $^{68}$Ga-DOTA/NOTA Benzamides for Melanoma Imaging
Jeong Hoon Park (KAERI), Hee Jung Kim (Radiopharmaceutical Lab), Dong Yeon Kim (Chonnam National Univ), Min Goo Hur, Seung Dae Yang (KAERI), Kook Hyun Yu (Dongguk Univ)

B27 Synthesis of Novel Radiopharmaceuticals Using Gallium-68 Labeled $\text{Fe}_3\text{O}_4$ Nanoparticles
Bo Bae Cho (Dongguk Univ), Joon-Young Lee, Jung-Hoon Park, Min-Goo Hur (KAERI), Kook Hyun Yu (Dongguk Univ)

B28 Synthesis of $[^{123}]$ Iodoanthraquinones as a Radiotracer of Breast Cancer
B29 Development of a Prelabeling Approach for a Targeted Nanochelator  
Jonathan Fitzsimmons, Robert Atcher (LANL), Cathy Cutler (Univ of Missouri)

B30 Radiometric Enzyme Assays: Tools for Studies of Biotransformations of Thyroid Hormones  
S. Pavelka (Acad. Sci. Czech Rep.)

B31 Use of Radioanalytical Methods for Following the Development of Diet-Induced Obesity in the Mouse  
S. Pavelka, J. Kopecky (Acad. Sci. Czech Rep)

B32 KIT Formulation and Adaptation of PET- Procedure for Fast and Effective Visualization of Inflammation Sites with $^{68}$Ga-Citrate  

B33 Prospects for Production of Alpha Emitters for Medical Use at JSC “SSC RIAR”  

B34 Facile and Efficient Synthesis of $^{125}$I-Labeled Hyaluronic Acid  
Sang Hyun Park (KAERI/Univ of Science and Technology), So-Young Ma, Dong-Eun Lee, Dae Seong Choi (KAERI)

B35 Spatial Resolution of Ionization Chamber Arrays in $^{60}$Co Radiotherapy  
Qiang Du, Zhifang Wu, Guilai Xing (Beijing Key Lab/Tsinghua Univ)

B36 Enhanced Kinase Assay Based on Radio-Phosphorylation  
Sang Hyun Park (KAERI/Univ of Science and Technology), Jong Kook Rho, Mi Hee Choi (KAERI)

B37 Determination of the Labeling Yield and Stability of the Complexes Bi-BSA-DOTA and Bi-BSA-DTPA  

B38 Evaluation In-House Manufactured $[^{99m}Tc]$-ECDG in Different Animal Models Relative to Normal Distribution, Tumour- and Infection Detection  
J. Wagener (Nesca), J. Horn-Lodewyk, A. C. Otto, M. Janse van Vurren (Universitas Hospital), J. van Staden, S. Lamprecht (University of the Free State), V. Kleinhans, A. Coetzee, C. Bester (North-West Univ), J. R. Zeevaart (Necsa/North-West Univ)

INDUSTRY AND AGRICULTURE

B39 Reproductive Performance of Crossbred Dairy Cows in Bangladesh: An Isotopic Radiomunoassay Study  
M. A. Samad Khan, M. S. R. Siddiki, M. E. Uddin (Bangladesh Agricultural Univ)

B40 Consideration of Sky-Shine Radiation Effects for the Development of Korean Regulatory Guide on Industrial Radiography  
Yong Ki Chi, Bokyun Seo, Wan-Tae Kim (KINS)
**B41** Design of Silicon Photomultiplier Based Optical Fiber Dosimeter with Scintillator for High-Dose Radiation Detection in Nuclear Wastes and Radiosurgery

J. H. Kim, K. S. Joo (Myongji Univ)

**B42** High Quality Kapton Sandwich $^{22}$Na Radioactive Sealed Source for Positron Annihilation Lifetime Spectroscopy

T. Yamada, H. Ishizu, R. Chika (Japan Radioisotope Association), M. Yamawaki (NIAIST)

**B43** Preparative and Analytical RadioHPLC of Indole-3-$[^{1-11}]$C Acetic Acid for PET Imaging of Auxin Transport in Living Plant

Andrea M. Jedele, Paul A. Ellison, Dhanabal Murali, Todd E. Barnhart, Robert J. Nickles, Onofre T. DeJesus (Univ of Wisconsin, Madison)

**B44** A Study on Alloy Compensation in Isotope Thickness Measurement of Steel

Xiaomin Zhang, Zhifang Wu (Tsinghua Univ)

**B45** A Functional Plant PET Imager with Controllable Environment and Configurable Geometry

Qiang Wang, Aswin J. Mathews, Ke Li, Sergey Komarov, Homayoon Ranjbar, Patrick Zerl, Joseph A. O'Sullivan, Yuan-Chuan Tai (Washington Univ)

**B46** Biological Full Value and Safety of Crops Produced by Using Radiation Engineering Technology

A. V. Ivanov, A. A. Ivanov, G. V. Konyukhov, R. R. Gayzatullin (Federal State Budgetary Institution)

**B47** Mineralisation of $^{14}$C-Labelled Glucose in Litter and Soils from Sugarcane Fields as Affected by Mineral Nitrogen

Eduardo Mariano (ESALQ/USP), C. O. Trivelin (USP/CENA), Paul W. Hill, Davey L. Jones (SENERGY/Bangor Univ)

**Wednesday, August 27, 2014, 3:00 P.M.**

**PRODUCTION OF PET RADIONUCLIDES**

Session Organizer: Syed M. Qaim (Forschungszentrum Juelich), Suzanne Lapi (Washington Univ)

Cochairs: Suzanne Lapi (Washington Univ, St.Louis), Ingo Spahn (Research Centre Jülich)

**Production Scale Purification of Ge-68 from Irradiated Gallium Metal**

Jonathan M. Fitzsimmons, Leonard F. Mausner (BNL), invited

**High Power Water Targets for the Production of $^{18}$F—Review of Design Features and Analytical Techniques**

Matthew H. Stokely, Johanna L. Peeples (BTI Targetry LLC), J. Michael Doster (NCSU), Timothy A. Faugl (BTI Targetry LLC/NCSU), Igor A. Bolotnov (NCSU), Michael C. Poorman (BTI Targetry LLC), Gerald T. Bida (Duke Univ), Bruce W. Wieland (BTI Targetry LLC), invited

**Cyclotron Production of $^{44}$Sc for Radiopharmaceutical Applications**

Maruta Bunka (Univ of Bern), Cristina Mueller, Nicholas van der Meulen (Paul Scherrer Inst), Roger Schibli (Paul Scherrer Inst/ETH Zurich), Andreas Tuerler (Univ of Bern/Paul Scherrer Inst)
Development of the Non-Standard PET Radionuclides $^{45}$Ti, $^{73}$Se and $^{75,76}$Br
Heinz H. Coenen, Ingo Spahn (FzJ), invited

Sustainable PET Tracer Production at Wisconsin: Stayin’ Alive
R. J. Nickles, T. E. Barnhart, O. T. DeJesus, B. T. Christian (Univ of Wisconsin, Madison), invited

Production of Longer Lived Positron Emitters at BNL
Leonard F. Mausner, Dmitri G. Medvedev, Jonathan M. Fitzsimmons (BNL), invited

Zirconium-89: From Production to Clinical Application
Danielle J. Vugts, Guus A. M. S. van Dongen (VU Univ Medical Center), invited

New Developments in the Production of Generator Systems for Positron Emitters
Frank Roesch (Univ of Mainz), invited

Radionuclide Production Using a Compact, Low-Energy Accelerator System
William D. Webster, Geoffrey T. Parks (Univ of Cambridge), Dmitry Titov (Siemens Ltd), Paul Beasley (Siemens CT TIP Technology and Concepts), Oliver Heid (Siemens AG)

Isotopes for Combined PET/SPECT Imaging
Chary Rangacharyulu, Christine K. Roh (Univ of Saskatchewan)

Potential Contaminated Emissions Due to PET Technologies Operation
O. Bezshyyko (Taras Shevchenko National Univ), B. Bondar (Taras Shevchenko National Univ/All-Ukrainian Center for Radiosurgery of the Clinical Hospital “Feofania”), T. Govorukha (Kyiv City Oncological Clinical Center), L. Golinka-Bezshyyko, I. Kadenko (Taras Shevchenko National Univ), V. Kirichenko (Kyiv City Oncological Clinical Center), Ya. Kmetyuk (All-Ukrainian Center for Radiosurgery of the Clinical Hospital “Feofania”), O. Shevchenko (Kyiv City Oncological Clinical Center)

ECONOMICS OF RADIOISOTOPE PRODUCTION AND SUSTAINABILITY
Session Organizer: Ron Francis Cameron (OECD-NEA)
Cochairs: Roy W. Brown (Mallinckrodt Pharmaceuticals), Henri Bonet (IRE, retired)

European Union’s Efforts to Sustain the Supply of Mo-99
Remigiusz Baranczyk, Stamatios Tsalas (EC/Euratom Supply Agency), Guy Y. Turquet de Beauregard (AIPES), invited

Sustainability of LEU Based $^{99}$Mo Manufacturing
P. A. Louw (NTP Radioisotopes SOC Ltd), invited

Production Capacities of Mo-99/Tc-99m Manufacturing Enterprises Within ROSATOM State Corporation’s Isotope Complex
Aleksey Vakulenko (JSC Isotope)

SECURING THE SUPPLY OF ISOTOPES IN THE FUTURE
Session Organizer: Richard August Henkelmann (ITG)
Cochairs: Richard August Henkelmann (ITG), Robert Atcher (LANL)

Commercial Production of Ge-68
William C. Uhland (Mallinckrodt)
Heavy Isotopes Lead Material Management Organization (*LMMO*)
Bradley D. Patton, Sharon M. Robinson (ORNL)

The U.S. Department of Energy Isotope Development and Production for Research and Applications Program
Robert W. Atcher (LANL)

MEDIUM AND HIGH ENERGY ACCELERATOR/CYCLOTRON PRODUCTION OF ISOTOPES
Session Organizers: Boris Zhuikov (*RAS*), Francois Meiring Nortier (*LANL*)
Cochairs: F. Meiring Nortier (LANL), Boris Zhuikov (RAS)

An Overview of North American Intermediate-Energy Facilities and Isotope Production Capabilities
Kevin D. John, Eva R. Birnbaum (LANL), invited

The Future of Isotope Production on Medium and High Energy Proton Beams
Boris L. Zhuikov (RAS), invited

Medium Energy Accelerators for Isotope Production in Europe
F. Haddad (Subatech/GIP Arronax), invited

Experiences with Bombardments, Monitoring and Interlocking in High-Intensity Split-Beam Operations Using 66 MeV Protons Delivered by a Separated Sector Cyclotron
C. Vermeulen, G. F. Steyn, N. P. Stodart (iThemba Labs), invited

The Status and RI Production Plan of KOMAC
Kye-Ryung Kim, Sang-Pil Yoon, Yong-Sub Cho (KAERI), invited

Isotope Production Using a Superconducting Electron Linac
Terry L. Grimm, Chase H. Boulware, Dyle D. Henning, Jerry L. Hollister, Erik S. Maddock, Valeriia N. Starovoitova (Niowave Inc.), Frank Harmon, Jon L. Stoner (Idaho State Univ)

Production of Medical Isotopes from a Thorium Target Irradiated by Light Charged Particles Up to 68 MeV
Charlotte Duchemin, Arnaud Guertin (Univ de Nantes), Ferid Haddad, (Subatech/GIP Arronax), Vincent Métilvier (Univ de Nantes), Nathalie Michel (GIP Arronax)

Recent Developments Using Polymer Assisted Deposition in Fabricating Radioactive Targets for Nuclear Reactions
Thomas F. Wall, Heino Nitsche (Univ of Calif-Berkeley)

SEPARATION CHEMISTRY AND TARGET PREPARATION FOR NUCLEAR CHEMISTRY EXPERIMENTS
Session Organizer: Heinz Walter Gaeggeler (Paul Scherrer Inst)
Cochairs: Sharon Robinson (ORNL), Matthias Schaedel (JAEA/GSI)

Heavy Element Program at Oak Ridge National Laboratory
Julie G. Ezold, Rose A. Boll, L. Keven Felker (ORNL), invited

Adventures in Californium Purification and Electrodeposition
Jonathan D. Burns, Shelly M. Van Cleve, Edward H. Smith, Rose A. Boll (ORNL)
High Accuracy Fission Product Measurements for the Qualification NpO₂ Targets for the Production of Plutonium-238
Benjamin D. Roach, Jeffrey S. Delashmitt, Joseph M. Giaquinto, Ian C. Gauld, Ralph H. Ilgner, Tamara J. Keever, Rob R. Smith (ORNL)

NPL’s Programme for the Preparation of Neutron Deficient Lanthanides, Actinides and Other Elements
Simon Jerome, Peter Ivanov, Cyrus Larijani (National Physical Lab), David Parker (Univ of Birmingham), Patrick H. Regan (National Physical Lab/Univ of Surrey)

Fluorescent BINOL-Based Sensor for Thorium Recognition
Jun Wen, Sheng Hu, Tong-Zai Yang, Xiao-Lin Wang (China Academy of Engineering Physics)

Evaluation of Hydrogen Isotopes Separation by Catalytic Isotope Exchange in Liquid Phase
Gheorghe Ionita, Ciprian Bucur, Ionut Spiridon, Ioan Stefanescu (Inst for Cryogenics and Isotopic Separation)

HEAVY AND SUPERHEAVY ELEMENTS RESEARCH
Session Organizers: Andreas Türler (Paul Scherrer Inst), Heinz W. Gaeggeler (Paul Scherrer Inst)
Cochairs: Andreas Tuerler (Paul Scherrer Inst.), Julie Ezold (ORNL)

From Medelevium to Flerovium—Probing Relativistic Effects in Heavy and Superheavy Element Chemistry Experiments
Matthias Schaedel (JAEA), invited

Mapping the N=152 Deformed Shell Closure with High-Precision Penning-Trap Mass Measurements of Transuranium Nuclides at TRIGA-TRAP
D. Renisch (Institut für Kernchemie), T. Beyer, K. Blaum (Max-Planck-Institut für Kernphysik), M. Block (GSI Helmholtzzentrum für Schwerionenforschung), Ch. E. Düellmann (Institut für Kernchemie/Helmholtzzentrum für Schwerionenforschung), K. Eberhardt Institut für Kernchemie/Helmholtzzentrum für Schwerionenforschung /Technische Universität Darmstadt), F. Schneider (Institut für Kernchemie/JGU Mainz)

Toward the Aqueous Chemistry of Copernicium Utilizing Homologue Separations
Philip Raymond Mudder, Heino Nitsche (University of California, Berkeley/LBNL)

Recovery of 248Cm from 252Cf Decay
Laetitia H. Delmau, L. Kevin Felker (ORNL)

ISOTOPES IN PLANT BIOLOGY: FUTURE SUSTAINABILITY IN ENERGY AND AGRICULTURE—I
Session Organizers: Richard A. Ferrieri (BNL), Ben Babst (BNL)
Cochairs: Lee Sobotka (Washington Univ, St. Louis), Prem Srivastava (DOE)

PhytoPET, PhytoBeta and PhytoSPECT: Radioisotope Imaging Systems Being Developed for Plant Biology Research
Andrew Weisenberger (Thomas Jefferson National Accelerator Facility), invited
Technologies for Quantitative, Non-Destructive, and 3D Imaging of Plant Function
Paul Vaska, David J. Schlyer, Craig L. Woody (BNL), invited

Live-Imaging Technologies at Center Stage: Can They Provide Practical Answers in Plant Nutrition?
Shu Fujimaki (JAEA), invited

Imaging Uptake, Transport, and Distribution of Radiotracers in Brassica Oleracea Using Positron Emission Tomography
Paul A. Ellison, Elizabeth O. Ahlers, Todd E. Barnhart, Tom Bryan, Alexander K. Converse, Samuel T. Doran, Jackson D. Hetue, Andrea M. Jedele, Katherine A. Lake, Robert J. Nickles, Paul H. Williams, Onofre T. DeJesus (Univ of Wisconsin, Madison), invited

Statistical Analysis of Carbon Fixation and Translocation in Arabidopsis Seedlings on Petri Dish by Using Positron-Emitting Tracer Imaging System (PETIS)
Naoki Kawachi (JAEA), Atsushi Koyanagi (JAEA/Tokyo Univ of Science), Nobuo Suzui, Yong-Gen Yin, Satomi Ishii (JAEA), Hiroaki Shimada (Tokyo Univ of Science), Shu Fujimaki (JAEA)

Combined 3D PET and Optical Projection Tomography Techniques for Root Phenotyping
Qiang Wang, Sergey Komarov, Aswin J. Mathews, Ke Li (Washington Univ), Christopher Topp (Donald Danforth Plant Science Center), Joseph A. O’Sullivan, Yuan-Chuan Tai (Washington Univ)

MRI-PET Measurements for Scoring Root Traits in the Soil
Siegfried Jahnke, Dagmar van Dusschoten, Ralf Metzner, Jonas Büehler, Gregor Huber, Daniel Pflugfelder, Matthias Streun, Simone Beer, Ulrich Schurr (FZJ), invited

Thursday, August 28, 2014, 8:00 A.M.

ISOTOPE RECOVERY AND RECLAMATION
Session Organizer: Dorothea Schumann (Paul Scherrer Inst)
Cochairs: Dorothea Schumann (Paul Scherrer Inst.), Henri Bonet (IRE, retired)

Accelerator Waste at PSI—A Source for Exotic Isotopes
Rugard Dressler, Dorothea Schumann (Paul Scherrer Inst), invited

Preserving Pu-244 and Heavy Curium in Mark-18A Targets
Sharon Robinson, Bradley Patton (ORNL)

Separation of Isobaric Interferences in HR-ICP-MS
Niko Kivel, Heiko-Dirk Potthast, Dorothea Schumann (Paul Scherrer Inst)

Development of a New Versatile Analytical System for Isotope Analysis
Heiko Dirk Potthast, Niko Kivel (Paul Scherrer Inst)

Recycling of ²⁴¹AmBe Neutron Sources
Joseph Lapinskas (QSA GLOBAL Inc.)

Separation of ⁷Be from the Cooling Water of a Neutron Spallation Source
Dorothea Schumann (Paul Scherrer Inst), Marin Ayranov (EC, DG-Energy), Tanja Stowasser (Paul Scherrer Inst)
213Bi-DOTATOC Receptor Targeted Alpha-Radionuclide Therapy Induces Remission in Neuroendocrine Tumors Refractory to Beta-Radiation—A First in Human Study

F. L. Giesel, C. Kratochwil (Univ Hospital Heidelberg), F. Bruchertseifer (Inst for Transuranium Elements, EC), W. Mier (Univ Hospital Heidelberg), C. Apostolidis (Inst for Transuranium Elements, EC), U. Haberkorn (Univ Hospital Heidelberg), A. Morgenstern (Inst for Transuranium Elements, EC), invited

Large-Scale Production of Actinium-225


Application of HPLC for Selective Separation of Accelerator-Produced 225Ac from 140La, and Other Lanthanide Radioisotopes

J. Giaquinto, D. L. Denton, I. Ilgener, J. M. Cosgrove (ORNL), D. G. Medvedev, L. F. Mausner (BNL), S. Mirzadeh (ORNL),

Targeted Liposomes Loaded with Actinium-225 for Antivascular Alpha-Particle Therapy

Stavroula Sofou, Amey Bandekar, Chalres Zhu (Rutgers Univ), Sangeeta Ray Banerjee, Martin Pomper (Johns Hopkins Medical School), Frank Bruchertseifer, Alfred Morgenstern (EC JRC), invited

Radioactive Nanoparticles

A. Bilewicz, A. Piotrowska, E. Leszczuk, L. Janiszewska, P. Kożmiński (Inst of Nuclear Chemistry and Technology), A. Morgenstern, F. Bruchertseifer (Inst for Transuranium Elements, JRC), invited

Investigation of Astatine Chemistry in Solution

G. Montavon (Subatech), N. Galland (CEISAM), invited

Dosimetric Assessment of Radium-223 Radionuclide Therapy Using Whole Body Pharmacokinetic Modeling

Muhammed Bedir, Benjamin Cox, Stephen Graves, Sabrina Hoffman, Kurt Pedersen, Alexandra Schroeder, Natalie Weisse, Bryan Bednarz (Univ of Wisconsin-Madison)

Use of 11C to Study Sugar Transport and Partitioning in Bioenergy Crop Sorghum

Abhijit Karve, David Alexoff, Dohyun Kim, Michael Schueller (BNL), David Braun (Univ of Missouri, Columbia), Ismail Dweikat (Univ of Nebraska), Benjamin Babst (BNL), invited

Carbon Partitioning in Soybean Leaves by Combined 11C and 13C Labeling

R. C. Dirks, M. Singh, G. S. Potter, Lee G. Sobotka, J. Schaefer (Washington Univ), invited

Allocation and Partitioning of Recently Fixed Carbon as 11C in Arabidopsis Thaliana

ISOTOPES IN PLANT BIOLOGY: FUTURE SUSTAINABILITY IN ENERGY AND AGRICULTURE—II

Session Organizers: Richard A Ferrieri (BNL), Ben Babst (BNL)
Cochairs: Siegfried Jahnke (Research Centre Jülich), Paul Ellison (Univ of Wisconsin, Madison)

Use of 11C to Study Sugar Transport and Partitioning in Bioenergy Crop Sorghum

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Allocation and Partitioning of Recently Fixed Carbon as 11C in Arabidopsis Thaliana
Abigail P. Ferrieri (Max-Planck Institute for Chemical Ecology), Beverly Agtuca (State Univ of New York Environmental Science and Forestry), Heidi M. Appel (Univ of Missouri), Richard A. Ferrieri (BNL), Jack C. Schultz (Univ of Missouri), invited

Mobility of Immune Ligands and Signal Molecules in the Model Plant Arabidopsis
Jean T. Greenberg, Joanna Jelenska, Nicolas Cecchini (Univ of Chicago), Sandra M. Davern, Robert F. Standaert (ORNL/Univ of Tennessee), Saed Mirzadeh (ORNL), Andrew N. Gifford (BNL), invited

Short-Lived Radioisotopes to Investigate if Fungal Symbionts in Plants are Parasites or Mutualists
Chantal D. Reid, Greg Bonito (Duke Univ), Larry Cumberbatch (Duke Univ/ Triangle Univ Nuclear Lab), Andrii Gryganskyi (Duke Univ), Alex Crowell, Calvin R. Howell (Duke Univ/Triangle Univ Nuclear Lab), invited

Providing Foundational Knowledge of Resource Allocation and Stem Growth Regulation in Bioenergy Crops
Benjamin A. Babst (BNL), David Braun (Univ of Missouri, Columbia), David Alexoff, Youwen Xu, Wenchao Qu (BNL), Anna Kunert (Johannes Gutenberg Univ), Michael Schueller, Ryan Tappero, Lisa Miller (BNL), invited

APPLICATIONS OF RESEARCH AND INDUSTRIAL ISOTOPES
Session Organizer: Meera Venkatesh (IAEA)
Cochairs: Elisabete Fernandes (CENA), Meera Venkatesh (IAEA)

Radiotracer Generators for Application in Process Industries
Tor Bjørnstad (IFE/Univ of Oslo), Liv Stavsetra, Kristin Fure, Are Haugan (IFE), invited

Applications and Impact of Radiotracers and Nucleonic Measurement Systems for Investigation of Sediment Transport
Jefferson Vianna Bandeira, Lécio Hannas Salim (Brazilian Nuclear Energy Commission), Patrick Brisset (IAEA), Catherine E. Hughes (ANSTO), invited

Polarized $^3$He Spin Filters for Neutron Science
Thomas R. Gentile (NIST), invited

Development of Radioactive Nano Particles for Industrial Application
Sung-Hee Jung (KAERI), Sung-Ho Choi (Hannam Univ), Jin-Ho Moon, Jong-Bum Kim (KAERI), Min-Seok Oh, Sang-Ei Seo (Hannam Univ)

Investigation of the Impact of Dense Vertical Internals on Hydrodynamics in Bubble Column Reactors Using Advanced Measurement Techniques
Mohammed Al Mesfer (King Khalid Univ), Muthanna Al-Dahhan (Missouri Univ Sci Tech)

Utilization of Enriched Stable Isotopes to Increase Isotope Reactor Output and Improve the Quality of Radioisotope Sealed Sources
Robert Neal Brosolovsky (QSA Global, Inc)

Research on Cobalt-60 Spiral CT for Studying Fuel Sphere’s Motion Law in HTGR
Ximing Liu, Zhifang Wu, Peng Cong, Jichen Miao (Tsinghua Univ)

Thursday, August 28, 2014, 10:20 A.M.
## CLOSING PLENARY
Session Organizer: Paul T. Dickman (ANL), Rolf Zeisler (NIST), Stephen P. LaMont (LANL)
Cochairs: Paul Dickman (ANL), Wessel Van Zyl de Villers (IAEA)

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