

Table of Contents	v
Dedication	xi
Appreciation	xii
Introduction	xiii
Session I: Accelerators and Target Systems	1
Introduction	3
R. Shefer and R. Hamm	
A New Versatile Target Design	4
U. Zetterberg and J. Koziarowski	
Pushing Beam Currents to the Limits	5
N.R. Stevenson, F.M. Nortier, W.Z. Gelbart, and J. Orzechowski	
RF Linacs for Radioisotope Production	12
R. Hamm	
³ He RFQ for PET Isotope Production	20
K. Krohn	
An Ultra-compact ¹³ N Ammonia Generator	30
R.E. Klinkowstein, R.E. Shefer, B.J. Hughey, and M.J. Welch	
Status of Targetry and Operation of the TR-13 Cyclotron	33
T. Ruth and K. Buckley	
Superconducting Cyclotron for Clinical PET	38
Masahiro Tanaka	
Session II: Targetry and Production	45
Introduction	47
R.J. Nickles and T.J. Ruth	
Study of Static and Dynamic Effects in Gas Targets	48
F. Tarkanyi, S. Takacs, S.J. Heselius, O. Solin, and J. Bergman	

Formation of Voids in a Liquid Target due to Charge Deposition B. Amini, R. Nutt, D.C. Patton, and G. Bida	59
The Yield of F-18 from Different Target Designs in the $^{18}\text{O}(p,n)^{18}\text{F}$ Reaction of Frozen $[^{18}\text{O}]\text{CO}_2$ M.L. Firouzbakht, D.J. Schlyer, and A.P. Wolf	69
Production of ^{18}F from a Sodium Metal Target R. Schwarzbach, P. Blauenstein, I. Huzar, J. Jegge, and P. A. Schubiger	77
Surface-Sensitive Analysis of Materials Used in the Production of PET Radioisotopes C.W. Alvord	82
An Investigation of Aluminum Alloy 6061 Heat Treatment and It's Effects on Iodide Absorption on Nordion Gas Targets D.R. Williams, S. Heilemann, B. Webster, and J. Orzechowski	105
Heat Transport in Targets and What it Means to Me. R.J. Nickles	119
Recovery of Enriched Stable Isotopes in Radionuclide Production A.A. Razbash, Yu G. Sevastyanov, O.N. Polyakov, N.N. Krasnov, N.A. Konyakhin, Yu. V. Tolstouhov, A.G. Maklachkov	121
Production of Long-lived Radioisotopes and it Application to Calibration Sources for PET Cameras. C. Gonzalez-Lepera	126
Overcoming Cyclotron Energy Constraints Through Targetry R. Finn, Y. Sheh, J. Vecchione, D. Schlyer, M. Firouzbakht	130
Modeling of Target/Thermal Properties for BLIP Upgrade L.F. Mausner, J.C. Hock, K.L. Kolsky, J.E. Tuozzolo	134
Target Design Considerations for High Specific Activity $^{11}\text{CO}_2$ Production R.A. Ferrieri, D. Alexoff, D.J. Schlyer, K. McDonald, A.P. Wolf	140
Session III: Specific Targetry Problems	151
Introduction M. Berridge and D. Maylotte	153

Overview of Ammonia Production M. Berridge	154
A Novel Solid Graphite Target for the Production of [¹³ N]Ammonia B.J. Hughey, R.E. Shefer, R.E. Klinkowstein, C.S. Dence, and M.J. Welch	160
Production of N-13 Ammonia Using a Solid Graphite Target and the ¹² C(d,n) ¹³ N Nuclear Reaction C.S. Dence, M.J. Welch, B.J. Hughey, R.E. Shefer, and R.E. Klinkowstein	168
Experiences with a New High Pressure Water Target for the Production of [¹³ N]Ammonia C. Gonzalez-Lepera, B. Dembrowski, J. Staub	171
Experience with the NIH Ethanol Water Target M. Channing	178
In-Target Preparation of [¹³ N]-Ammonia: Target Design and Chemistry. M. Berridge and B.J. Landemeier	180
[¹³ N]Ammonia Production via Deuteron Irradiation of Buckminsterfullerene G. Bida, N. Satyamurthy, E. Zippi	183
An Experimental Carbon/Steam Stack Target for in-situ Production of [¹³ N]Ammonia with Low Energy Deuterons J.-L. Morrelle	189
Session IV: Poster Discussions	203
<i>Session Summary</i> F. Helus and B. Wieland	205
Targetry for the Ruthenium-97 and Tungsten-178 (Tantalum-178) Production on the Phasotron of JINR N.G. Zaitseva, V.I. Stegailov, V.A. Khalkin, N.G. Shakun, P.T. Shishljannikov	208
Excitation Function for ¹⁷⁸ W Production in the ¹⁸¹ Ta(p,4n) ¹⁷⁸ W Reaction over the Energy Range 28.8-71.8 MeV N.G. Zaitseva, E. Rurarz, V.A. Khalkin, V.I. Stegailov, and L.M. Popinenkova	213

A Target Chamber for the Routine Production of [¹⁸F]-F₂ J. R. Dahl, A. Belakhlef, R.A. Matakchieri, T.C. Chaly, J. Koziarowski, D. Margouleff	219
Determination of Excitation Functions for ²⁰Ne(p,p2n)¹⁸Ne-->¹⁸F and ²⁰Ne(p,p2n)¹⁸F and a Re-examination of Production of [¹⁸F]F₂ with Protons on Neon. G.N. Reddy, H.-F. Beer, and P.A. Schubiger	226
Purification of ⁹⁰Zr using a Hydroxamate Column W.E. Meijs, J.D.M. Herscheid, H.J. Haisma, P.J. van Leuffen, R. Mooy, and H.M. Pinedo	232
Nuclear Data Relevant to the Production of ⁶⁷Ga: A Critical Comparison of Excitation Functions/Thick Target Yield Data for ⁶⁷Zn(p,n) and ⁶⁸Zn(p,2n) Nuclear Reactions F. Szelecsenyi, T.E. Boothe, S. Takacs, F. Tarkanyi, E., Tavano, M. Plitnikas	234
Session V: Isotope Processing and Automation	243
Moderator Comments on the Automation Session J. Link, J. Clark	245
Detectors and Transducers for Target Operations and Automated PET Chemistry S. Zeisler T. Ruth, M.P. Rektor, G.A. Gschwandter	249
A Simple Liquid Detector for Radiopharmaceutical Processing Systems D. Alexoff, K. Hallaba, D. Schlyer, and R. Ferrieri	261
Remote Sensing of Liquid Target Operations R. Ferrieri, D.L. Alexoff, and D.J. Schlyer	266
Solvent Vapor Sensor and Bolus Detector for Radiosynthesis A. Ducret, L. Veyre, P. Landais, D. Le Bars	271
Sensors for Indication Evaporation of Solvents: Experience at the University of Washington J. Link, K. Krohn, J. Courter	274
An Efficient System for the Preparation of [¹³C]HCN, CO₂, and CO J.R. Dahl, R. Matakchieri, A. Belakhlef, T.C. Chaly, D. Margouleff	276

A Simple System for Remote Processing and Delivery of H ₂ [¹⁵ O] produced from a N ₂ /H ₂ Target R.A. Ferrieri, D.L. Alexoff, D.J. Schlyer, A.P. Wolf	284
Synthetic Application of Column Extraction to Automated Preparations of PET Radiopharmaceuticals R. Iwata and T. Ido	294
Use of Supercritical Carbon Dioxide Fluid as a Solvent for the Purification of PET Radiotracers R.A. Ferrieri, J.S. Fowler, A.P. Wolf	298
Presentation of the FDG Microlab J. Kozirowski	308
Advances in the Robotic Production of Radiopharmaceuticals G. Gaehle, M.J. Welch	312
Application of an Industrial Robot to Nuclear Pharmacy J Viola	319
Control of Radioactive Material Pneumatic Transport System using an Inexpensive Programmable Logic Controller B. Dembrowski, C. Gonzalez-Lepera	323
Remote/Local Control Circuit for Accelerator Targets A. Belakhlef, J.R. Dahl	330
Radiation Effects on Polymers J. Link	333
Experience with the IBA Automated Chemistry Systems S. Toorongian	335
Session VI: Reports from the Laboratories	337
PET Radiopharmaceutical Facilities at Washington University Medical School - An Overview C.S. Dence and M.J. Welch	339

Radioisotope Production at JYFL Accelerator Laboratory in Finland	344
J. Kumplainen, J. Hiltunen, J. Aysto, R. Julin, E. Liukonen, V. Nieminen, T. Poikolainen	
A New Radioisotope - Production Research Facility Utilizing Ion Beams from AVF Cyclotron	347
T. Sekine, M. Izumo, H. Matsuoka, K Kobayashi, N. Shigeta, A. Osa, M. Koizumi, S. Motoishi, K. Hashimoto, Y.Hatsukawa, F. Miura, T. Sorita, T. Moriya, H. Kudo, and H Umezawa	
Status of the Cyclotron/P.E.T. Facility at the State University of New York at Buffalo	353
S.A. Toorongian and M.S. Haka	
FDG Production and Quality Control at North Carolina Baptist Hospital Bowman Gray School of Medicine P.E.T. Center	357
R.E. Ehrenkauf	
Utilization of the CS-30 Cyclotron at the Duke University Medical Center	359
B.W. Wieland, C.S. McKinney and M.F. Dailey	
Production of ⁵⁵Co for Positron Emission Tomography	360
J.R. Dahl, J. Pan, R.A. Matakchieri, A. Belakhlef, D. Margouleff	
The BLIP Upgrade Project	364
L.F. Mausner	
Present Status and Prospects of Production of Radioisotopes with High Radiochemical Purity on the FLNR Accelerators	365
S.N., Dmitriev, G.G Gulbekyan, Yu. Ts. Oganessian	
Establishment of an European Astatine Collaboration	371
Regin Weinreich	
List of Participants	377