

Progress Report on Radionuclide Metrology (1999-2001)

**Korea Research Institute of Standards and Science
P.O. Box 102, Yusong, Taejeon 305-600, Republic of Korea**

1. Introduction

Due to the change of organizational structure of KRISS in Oct. 1, 2000, the radioactivity group and dosimetry group were combined into the ionizing radiation group. The staff members of radioactivity field within the ionizing radiation group consist of four physicists and one technician.

2. Research Activities

Standardization of Radionuclides :

- Activity measurements of Y-88, Co-58, and Eu-152 using bi-dimensional and conventional coincidence counting techniques.
- Emission-rate measurement of Cl-36 area source (100 mm X 100 mm) using multi-wire proportional counting system. (In progress)

Development of equipments and facilities :

- KRISS radon calibration chamber.
- Modification of temperature and humidity control system.
- Development of real time monitoring system for measurements of environmental parameter and radon concentration.
- TDCR (Triple to Double Coincidence Ratio) system.
- Change of three photo-multipliers to Burle model 8850.
- Characteristic test of the system (In progress).
- Internal gas proportional counting system.
- Construction of sampling unit for gaseous nuclides.
- Development of data collection and analysis software (In progress).

3. International Activities.

- BIPM intercomparison : Eu-152, Pu-238 (In progress)
- APMP intercomparison : Co-58, Y-88
- Multi lateral comparison : Cl-36 area source (Pilot lab. : ETL)

4. Laboratory Services

- Dissemination of radioactivity CRMs. (120 CRMs / y)
- Technical consultation to the industry.
- Calibration and test services for radiation detectors and radionuclides.
- Technical training for radiation workers.

5. Future Work

- Standardization of beta emitting nuclides by TDCR method and inter-comparison study.
- Development of radioactivity CRMs for medical use and environmental activity measurements.
- Development of radon measurement techniques and calibration of radon detectors.
- Standardization of radionuclides (Cr-51, Cs-137, Ce-139, Sn-113, Mn-54, Sr-85, I-125, P-32)
- Development of digital coincidence counting system with the HP Ge detector.
(Rel. Eff. : 130 %)

6. Others

- KRISS was certified to ISO 9001 in the field of calibration and testing service in Feb. 2001. KRISS is going to be reviewed about technical competence in the field of ionizing radiation by 2-3 assessors from abroad in order to meet the technical requirements of ISO 17025.
- KRISS radiation laboratory was restructured into a new clean environmental facility with an automatic control unit of temperature and humidity in Dec. 2000.

7. Publications

- H.Y. Hwang, T.S. Park, J.M. Lee, P.J. Oh, Development of a three-dimensional data acquisition method for measuring activities of pure beta-emitting nuclides. *Sae Mulli*, 39(5), 277 (1999)
- H.Y. Hwang, T.S. Park, J.M. Lee, P.J. Oh, Development of a multi-channel time scale technique for estimating accidental coincidences. *Ungyong Mulli*, 12(6), 513 (1999)
- H.Y. Hwang, T.S. Park and J.M. Lee, "Standardization of Co-57 by MCTS technique." *Nucl. Instr. and Meth.* 438, 340 (1999)
- T.S. Park, H.Y. Hwang and J.M. Lee, "Correlation Effect in Activity Measurement of ⁵⁹Fe." *Appl. Radiat. Isot.* 52, 435 (2000).
- H.Y. Hwang, T.S. Park and J.M. Lee, "Development of a three-dimensional data acquisition method for standardization of beta-emitting nuclides." Accepted in *Appl. Radiat. Isot.* 52, 393 (2000)
- H.Y. Hwang, H.J. Cho, T.K. Yang, T.S. Kim, T.S. Park, J.M. Lee, P.J. Oh, Applications of MCTS method in determining true coincidences for non-equal dead times. *Sae Mulli*, 40(6), 539 (2000)