

Progress report of NMIJ/AIST in Radionuclide Metrology (May 2005 to April 2007)

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1. International comparisons and SIR contributions.

- The NMIJ/AIST took part in the CCRI (II) key comparisons of ^{32}P (CCRI(II)-K2.P-32(2)) and ^{55}Fe (CCRI (II)-K2.Fe-55) activity measurements. We also sent ^{57}Co to the BIPM/SIR with our report.
- The NMIJ/AIST has organized the RMO key comparisons of ^{133}Ba activity measurement (APMP.RI (II)-K2.Ba-133). The ^{133}Ba liquid source in standard ampoules were prepared by NMIJ/AIST and the ampoules were sent to APMP participants of ANSTO, BARC, INER, INST, KRISS, NIM, NSRL-OAP, PTKMR-Batan and neighboring RMO of CSIR-NML (South Africa). In total, 10 laboratories have reported their results with their own methods. To link this RMO comparison to the BIPM/SIR, one ampoule was sent to the BIPM. Now, we are preparing the report for draft B.
- The NMIJ/AIST participated in the RMO key comparisons of ^{131}I activity measurement (APMP.RI (II)-K2.I-131).

2. Standardization and calibration services.

- Several measurement systems of Japan Radioisotope Association (JRIA) were calibrated with the primary standard sources from NMIJ/AIST.
- Domestic comparisons of $^{99\text{m}}\text{Tc}$ and ^{123}I were carried out between JRIA and several radioactive pharmaceutical manufactures. The NMIJ/AIST calibrated these sources possessed by JRIA by using the $4\pi\beta\text{-}\gamma$ coincidence counter.
- A new production method of area sources was applied to make very low level surface sources for calibration of imaging plate system, which was designed for a clearance test of radioactive waste.
- The new production techniques for area source using an inkjet printer have been tested continuously in NMIJ/AIST. We printed a radio-active source at the same position on aluminum surface repeatedly and expanded an activity range by using a printing machine for industrial use.
- A remote calibration service has started. Two certification reports were issued. One is for an activity measurement of pressurized ionization chamber calibrated by $^{99\text{m}}\text{Tc}$ and the other

is for a photoemission rate of ^{133}Ba by using an HPGe detector. JRIA, a secondary calibration laboratory of activity, also calibrated a dose calibrator in NIRS remotely.

- We applied a RFID to the remote calibration system. The RFID validated a performance of personnel handling target equipment and setting a source. The RFID is expected to improve a quality of the remote calibration system.

3. Plans for fiscal years of 2007 and 2008.

- The development of new production method of area sources will be continued. We have expanded the scope of development and will apply the imaging plate detector with a reference area source to surface contamination monitors.
- The development of remote calibration will be continued and expanded to some other secondary standard equipments and detectors used in various facilities by using computer network system.
- The NMIJ/AIST will participate in the BIPM key comparisons of ^{85}Kr activity measurement (CCRI (II)-K2.Kr-85) and other inter-comparisons.