

The Radiation Center of Osaka Prefecture (1959–1990)*

Tatsuo Tabata

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FIG. 1. Main building of former Radiation Center of Osaka Prefecture (presently part of Osaka Prefecture University).

1 History and Outline

The Radiation Center of Osaka Prefecture¹ (RCOP) was established in 1959 under the supervision of Professor Kiichi Kimura of Kyoto University. Professor Kimura became the first director (part-time). The RCOP was a nonprofit organization financed by the Government of Osaka Prefecture, and its purpose was to promote peaceful use of radiations and radioactive isotopes.

The RCOP played an important role as a unique institute in western Japan to carry out basic and applied researches of radiation science and technology as well as to provide various services. Researches covered such wide-ranging fields as industrial applications, material resources, agriculture, medicine, and environment. The services included irradiation with Co-60 gamma-ray sources and accelerators, sample analysis, and training and consultation on radiation technology. These were available not only for the people and organizations in Osaka Prefecture but also for those in the rest of Japan.

In 1960 the RCOP was united with Osaka Prefecture University (OPU) located next door, and its buildings including equipment became part of Research Institute for Advanced Science and Technology (RIAST), OPU. In 2005 OPU was united with two other universities, and on that occasion RIAST was also reorganized to become Frontier Science Innovation Center, OPU.

In 1988 the English name of RCOP was changed to Osaka Prefectural Radiation Research Institute (OPRRI). However, the new name lasted only two years. So, the

more popular, former name is used here.

2 Organization

The RCOP had five research departments and one for administration, and employed a staff of more than 110. The following list shows the name of the departments and the number of members in each department in the most active fiscal years:

- Health Physics and Instrumentation (9)
- Physics (22)
- Chemistry (24)
- Agrobiolology (12)
- Medical Biology and Hygiene (14)
- Administration (33)

Each member of the research departments belonged to one or more of research groups, which could be reorganized for each fiscal year. More than fifteen research groups were present. Some researchers were also obliged to belong to one of operation groups for radiation facilities. There were four operation groups; Department of Physics had Linac, CW (Cockcroft-Walton accelerator) and Cobalt-60 Operation Groups, and Department of Medical Biology and Hygiene had X-ray Unit Operation Group.

3 Facilities and Equipment

- *Hot Laboratory*: 100-kCi Co-60 gamma-ray irradiation facility of swimming-pool type, hot caves for gamma-ray irradiation, 18-MeV linear electron accelerator, Van de Graaff type ion accelerator, Cockcroft-Walton type electron accelerator
- *Tracer Laboratory*: rooms for the use of non-sealed radioisotopes, measurement rooms
- *Radwaste Water Treatment Facility*
- *Polymer Laboratory*
- *Radiation Control Laboratory*: multi-element analysis system, computer system

- *Animal Laboratory:* X-ray therapy unit, animal room
- *Main Research Building:* library, laboratories for non-radioactive materials, scanning electron microscope, various spectrometers

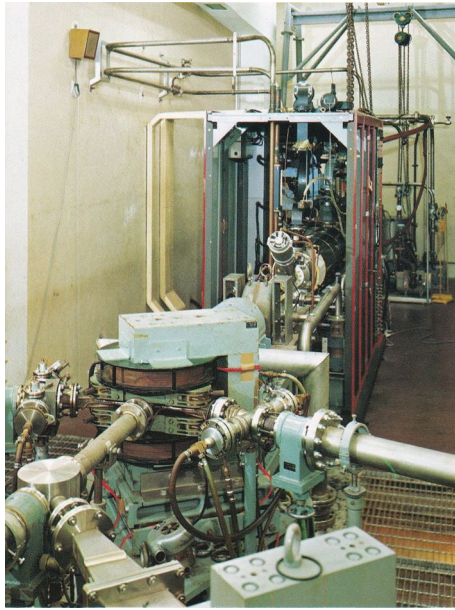


FIG. 2. Electron linear accelerator.

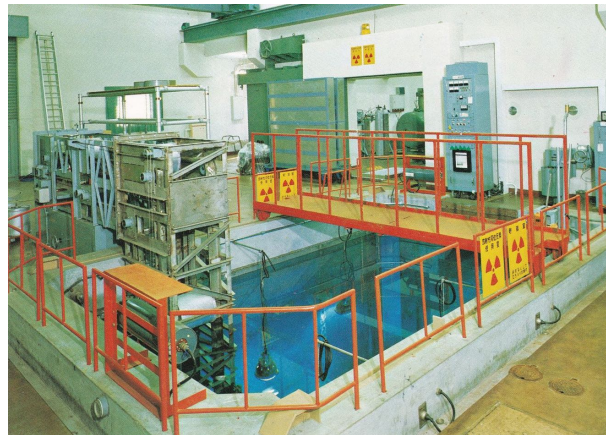


FIG. 3. Co-60 irradiation facility of swimming-pool type.

4 Research Results

Main topics for which important research results were obtained are as follows:

- *Physics*: interactions of electrons with matter, data compilation for thermonuclear fusion research, electron beam measurement, methods of irradiation and surface analysis with an ion accelerator, Co-60 gamma-ray dosimetry, neutron measurement, radiation effects on solid state materials, properties of semiconductors, radiation effects on insulators, development of radiation detectors, nuclear structures
- *Chemistry*: chemical effects caused by beta-decay; effects of beta-decay and gamma-ray irradiation on biotic substances, pulse radiolysis of solutions, coordination chemistry, labeling of organic compounds and pesticides, reaction of organic sulfur compounds, properties of physiologically active substances, reaction of organic silica compounds, properties of high molecular compounds, ion-molecule reactions
- *Agrobiolology*: soil conditioners, effects of environmental conditions on plant metabolism, mutagenic effects, transformation of organic compound by micro organisms
- *Medical Biology and Hygiene*: radiation effects on experimental animals, investigation and application of viruses, radiation effects on biologically important substances, radiation leukemogenesis, use of radiation in hygiene
- *Industrial application*: utilization of high-dose radiations, nondestructive testing, nondestructive element analysis, industrial utilization of radioactive isotopes, food irradiation
- *Environmental Science*: radioactive waste treatment, natural radioactivities and fallouts, neutron activation analysis of environmental pollution

5 Publications

- *Ten years of the RCOP* (in Japanese) (1969) [Osaka Prefecture University Library Request Number 429/16, Registration Number 9000101315].
- *Twenty-five years of the RCOP* (in Japanese) (1985) [National Diet Library Request Number M8-103; Osaka Prefecture University Library Request Number 429/16(1), Registration Number 9000101316].
- *Thirty years of the RCOP* (in Japanese) (1989) [Osaka Prefecture University Library Request Number 429/16/(1), Registration Number 2001041049].

- *Daihoken-Dayori (RCOP News)*, Vol. 1, No. 1 (1960)–Vol. 30, No. 4 (1990) (in Japanese) [National Diet Library Request Number Z15-429].
- *Annual Report of the Radiation Center of Osaka Prefecture*, Vol. 1 (1960)–Vol. 28 (1988); *Annual Report of the Osaka Prefectural Radiation Research Institute*, Vol. 29 (1989)–Vol. 30 (1990); (National Diet Library Request Number Z63-A159) (Note: The year attached to each volume represents, not the year of publication, but “the issue for the fiscal year.”)
- *Radiation Center of Osaka Prefecture Technical Report* (RCOP TR; research monographs published irregularly), No. 1 (1981)–No. 9 (1990); *Osaka Prefectural Radiation Research Institute Technical Report* No. 10 (1989) and No. 11 (1990) (OPRRI TR; ISSN 0285-8797; National Diet Library Request Number Z54-D134).

Titles of Technical Reports (RCOP TRs and OPRRI TRs)

1. *EDMULT—a Code for Evaluating Electron Depth–Dose Distributions in Multilayer Slab Absorbers*, Tatsuo Tabata and Rinsuke Ito (1981) (superseded by RCOP TR 8).
2. *Determination of Scattering Angle for the Use of Forward Alpha Scattering Analysis—For Very Light Element Analysis—*, Yatsuka Matsuda, Akira Mizohata, Norio Ito and Hiromitsu Nakabushi (1983).
3. *The Passage of Fast Electrons through Matter—The Work at the RCOP and Related Topics*, Tatsuo Tabata and Rinsuke Ito (1983).
4. *ALESQ—a Code for Nonlinear Least-Squares Fit; and TSOLVE—a Code for Nonlinear Best Approximation*, Rinsuke Ito and Tatsuo Tabata (1984).
5. *Cross Sections for Charge Transfer of Hydrogen Atoms and Ions Colliding with Gaseous Atoms and Molecules*, Tatsuo Tabata, Rinsuke Ito, Yohta Nakai, Akira Kikuchi and Toshizo Shirai (1986) [a revised version has been published: *At. Data & Nucl. Data Tables* **37**, 69 (1987)].
6. *Cross Sections for Charge Transfer of Hydrogen Atoms and Ions Colliding with Metal Vapors*, Tatsuo Tabata, Rinsuke Ito, Yohta Nakai, Toshizo Shirai, Masao Sataka and Toshio Sugiura (1987).
7. *Cross Sections for Charge Transfer of Helium Atoms and Ions Colliding with Gaseous Atoms and Molecules*, Tatsuo Tabata, Rinsuke Ito, Yohta Nakai and Toshizo Shirai (1987).

8. *Semiempirical Code EDMULT for Depth–Dose Distributions of Electrons in Multilayer Slab Absorbers: Revisions and Applications*, Rinsuke Ito and Tatsuo Tabata (1987).
9. *Single-Electron-Capture Cross Sections of Multiply-Charged Ions Colliding with H, H₂ and He*, Tatsuo Tabata, Rinsuke Ito, Yohta Nakai and Toshizo Shirai (1987).
10. *Development of Multifunctional Synthetic Fibers by Plasma Treatment*, Masayuki Yamagami, Setsuo Taniguchi and Ren Nakao (1989) (in Japanese).
11. *Partial Cross-Sections for Single-Electron Capture of Hydrogen Ions Colliding with Gaseous Atoms and Molecules*, Tatsuo Tabata, Rinsuke Ito, Yohta Nakai, Toshizo Shirai and Yoshio Funatake (1990).

Note: Papers in Annual Reports and Technical Reports authored by T. Tabata *et al.* are mostly downloadable from the present author's pages at the ResearchGate site <https://www.researchgate.net/home>.