Status of $^{99}Mo/^{99m}Tc$ Production Development by (n,γ) Reaction in JMTR

Kunihiko TSUCHIYA [1], Shizuo SOZAWA [1], Nobuhiro TAKEUCHI [2], Yasuaki SUZUKI [3], Yoshio HASEGAWA [4], Sadanori KAKEI [5] and Masanori ARAKI [1]

1 : Japan Atomic Energy Agency, 4002 Narita, Oarai, Higashiibaraki, Ibaraki 311-1393, Japan
2 : Chiyoda Technol Corporation, 3681 Narita, Oarai, Higashiibaraki, Ibaraki 311-1313, Japan
3 : Metal Technology Co. Ltd.., 276-21 Motoishikawa, Mito, Ibaraki 310-0843, Japan
4: ART KAGAKU Co., Ltd., 3135-20, Muramatsu, Tokai, Naka, Ibaraki, 319-1112, Japan
5: Taiyo Koko Corporation, 1603-1 Higashioki, Nakahiro-aza, Ako, Hyogo 678-0232, Japan

Tel:+81-29-266-7030 , Fax:+81-29-266-7071
E-mail : tsuchiya.kunihiko@jaea.go.jp

Technetium-99m (^{99m}Tc) is one of commonly used radioisotopes in the field of nuclear medicine. JAEA has a plan to produce ^{99}Mo by (n, γ) method, a parent nuclide of ^{99m}Tc in the Japan Material Testing Reactor (JMTR). The (n, γ)^{99}Mo production was selected from viewpoints of safety, nuclear proliferation resistance and waste management. However, the specific activity of (n, γ)^{99}Mo is very low, compared with that of (n, *f*)^{99}Mo. In case of Japan, all of ^{99}Mo are imported from foreign countries, therefore JAEA has been performed the R&D on production of $^{99}Mo/^{99m}Tc$ in JMTR with Japanese industrial users under the cooperation programs. The R&D on $^{99}Mo/^{99m}Tc$ production was adopted as new project in Tsukuba International Strategic Zone, last year. In this project, various devices for production of ^{99m}Tc solution will be equipped the hot cell in the JMTR Hot laboratory and the following R&D items will be carried out for the production improvement.

(1) Fabrication of irradiation target such as the sintered MoO_3 pellets,

(2) Separation and concentration of ^{99m}Tc by the solvent extraction from Mo solution,

(3) Examination of ^{99m}Tc solution for a medicine, and

(4) Mo recycling from Mo generator and solution.

In this symposium, the status of the R&D and construction of the PIE devices under this project will be introduced for the production of $^{99}Mo/^{99m}Tc$ production improvement.