

## Current status and developments of post irradiation examination techniques in JMTR Hot laboratory

Akira SHIBATA<sup>1</sup>, Taketoshi TAGUCHI<sup>1</sup>, Tatsuhiko AOYAGI<sup>1</sup>, Masayasu ITO<sup>1</sup>, Yoshiaki KATO<sup>1</sup>,  
Minoru YONEKAWA<sup>1</sup>, and Kazuo KAWAMATA<sup>1</sup>

*1 : Japan Atomic Energy Agency, 4002 Narita, Oarai, Higashiibaraki, Ibaraki 311-1393, Japan*

*Tel: +81-29-266-2266 , Fax: +81-29-266-7913*

*E-mail : shibata.akira@jaea.go.jp*

Japan Materials Testing Reactor (JMTR) is the largest scale materials testing reactor in Japan with a thermal power of 50MW. It is a testing reactor dedicated to the irradiation tests of materials and fuels. The JMTR hot laboratory was put into service in 1971 to perform Post Irradiation Examinations. The concrete cell No.1 in the hot laboratory is connected with the reactor by the water canal. Hence irradiated radioactive capsules or specimens are safely transferred under water through the canal. The JMTR stopped its operation in August 2006 for refurbishment. The reactor facilities have been refurbished from April, 2007.

In this report, modifications of facilities and installation of new experimental apparatuses in the JMTR hot laboratory are described.

### (1) Modifications of facilities

High burn-up fuels up to about 110 GWD/t for new BOiling Capsule (BOCA) irradiation tests will be treated at the JMTR. Activities from those tests would be higher than that of previous license of the concrete cell of the JMTR Hot laboratory. To take measure with this condition, reinforcement of shielding capacity of hot cells was performed.

The BOCA assembling apparatus in the hot cell also replaced to treat high burn-up fuels. In former method, the BOCA capsule was loaded into the hot cell using the horizontal gamma gate in air using a BOCA radiation-shielding container. A new assembling system in water was developed for the safety point of view.

### (2) Installations of new experimental apparatuses.

Three dimensional X-ray computed tomography apparatus which has 0.16 mm in spatial resolution was installed for non-destructive inspections. Experimental apparatus for <sup>99</sup>Mo/<sup>99m</sup>Tc production by (n, γ) method was installed for domestication of <sup>99</sup>Mo/<sup>99m</sup>Tc production for medical use. Remote welding apparatus will be installed to perform in-pile IASCC experiments. A nano-indenter with 5μm radius spherical indenter will be installed to evaluate mechanical properties of irradiated materials.

In future, the JMTR Hot laboratory will perform various post irradiation examinations with those advanced techniques to contribute research of irradiated materials and fuels after JMTR re-start.