Current Activities of KAERI-ICERR

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Keywords : ICERR, HANARO, KAERI, IAEA, research reactor

1. Introduction

Korea Atomic Energy Research Institute (KAERI) was designated as IAEA designated International CEntre based on Research Reactor (ICERR) by IAEA in 2019 and re-designated in 2024 [1]. The designated areas are professional (hands-on) training, and joint R&D projects. KAERI has achieved numerous accomplishments while carrying out activities related to the ICERR scheme. This paper presents the current activities of KAERI-ICERR.

2. Activities of KAERI-ICERR

2.1 ICERR

IAEA initiated the ICERR in 2014 which intends to help Member States gain timely access to relevant nuclear infrastructure based on the research reactors and their ancillary facilities [2]. The proposed scheme of is intended to help IAEA Member States gain timely access to relevant nuclear infrastructure based on research reactors and their ancillary facilities. ICERRs will make available their research reactors and ancillary facilities and resources to organizations/institutions/ researchers of IAEA Member States seeking access to users. For Users, ICERRs will provide an opportunity to access research reactor capabilities much sooner and, probably, at a lower cost. This availability may obviate the need, for example, to build a new research reactor in their country. Currently, eight institutes across seven countries such as CEA (France), RIAR (Russia), SCK CEN (Belgium), INL and ORNL (USA), KAERI (Korea), RATEN ICN (Romania), CNESTEN (Morocco) have been designated as ICERRs. The ICERR designation is limited to the following areas of activity:

- Education and training;
- Professional training;
- Joint research and development projects

In the ICERR scheme, the functions of the IAEA are the following:

- Facilitator in the development of the relationship between an ICERR and users ;
- Facilitator in fostering the collaboration among ICERRs;
- Promoter for enhancing utilization of existing research reactor facilities;
- Designating body responsible for ensuring that an ICERR candidate meets the established criteria for the designation.

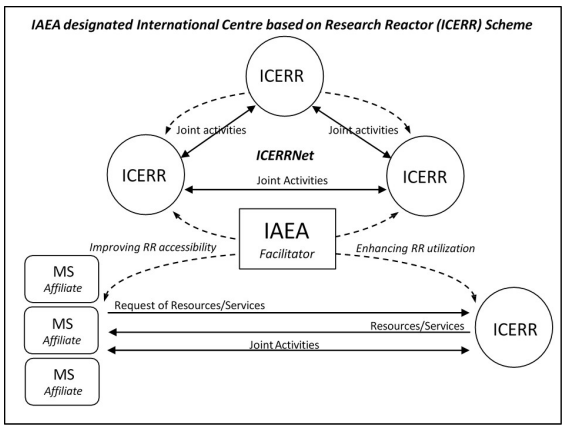


Fig. 1. ICERR scheme.

2.2 KAERI-ICERR

The designated areas for KAERI-ICERR are professional (hands-on) training and joint R&D projects [3][4]. The facilities of KAERI-ICERR include the High Flux Advanced Neutron Application ReactOr (HANARO), Radioisotope Production Facility (RIPF), neutron beam facility, neutron irradiation facility, Irradiated Materials Examination Facility (IMEF), and NTC (Nuclear Training and education Center).

HANARO is a 30 MW multi-purpose research reactor at KAERI designed for neutron beam applications, nuclear material testing, radioisotope production, Neutron Activation Analysis (NAA), Neutron Transmutation Doping (NTD), and so on. Its high neutron flux (fast neutron 2×10^{14} n cm^{-2} s^{-1}, thermal neutron 5×10^{14} n cm^{-2} s^{-1} at maximum) is essential for carrying out nuclear research and development.

RIPF is used for convenient processing and handling of irradiated radioactive objects. RIPF is equipped with four banks that consist of various numbers of hot cells depending on the functional requirements. Bank I has four concrete hot cells for sealed source handling such as Co-60 and Ir-192. Eleven lead hot cells in Bank II are dedicated for various research activities. In Bank III with six lead hot cells, medical purpose radioisotopes are produced. Bank IV has four lead hot cells in a clean room facility for radiopharmaceuticals.

The neutron beam facilities at HANARO have been widely opened to users from industry, academia, and research institutes both at home and abroad. They consist of the thermal neutron beam research facilities and the cold neutron beam research facilities.

There are total of 36 vertical irradiation holes in HANARO used for neutron irradiations. The capsule irradiation facilities of HANARO have been actively utilized for various irradiation tests such as research reactor fuels and targets, structural materials for fusion reactors, reactor vessel and internals, and in-core instrumentations by users. There are three pneumatic transfer systems installed at NAA irradiation holes that have been used for neutron irradiation of samples. NTD irradiation services for 5, 6, and 8 inch silicon ingots have been provided using two NTD holes located in the heavy water reflector region.

NTC provides a wide range of nuclear education and training programs based on KAERI technology and a world-class education infrastructure to nurture domestic and international nuclear experts. Internationally, NTC offers various education programs including utilization of radioisotopes, medical application of radioisotopes, research reactor experiments, nuclear fuel technology, nuclear power application, etc. Most international education programs are developed and implemented through international cooperation or bilateral cooperation.

2.3 Current Activities of KAERI-ICERR

KAERI-ICERR has achieved numerous results while carrying out activities related to the ICERR scheme. Current activities are as follows:

- supporting IAEA Member State's affiliates in fields of research reactor and its utilization;
- Carrying out several R&D collaborations with international users using facilities such as neutron beams, etc.;
- Hosting several international meetings conferences such as IAEA workshops and international conference on nuclear analytical techniques, etc.;
- Conducting several international training programs in fields of operation and utilization for research reactors;
- Accepting several international scientific visits to KAERI-ICERR facilities;
- Accepting several international fellowship trainings using KAERI-ICERR facilities.

3. Conclusions

KAERI has accumulated a wealth of R&D experience in the utilization of HANARO and ancillary facilities. KAERI-ICERR has engaged numerous activities since being designated as an ICERR in 2019. KAERI-ICERR offers professional (hands-on) training of personnel in the field of research reactor and joint R&D programs on the utilization of HANARO and ancillary facilities such as utilization of neutron beams, fuel and material irradiation, NAA, NTD, production and application of radioisotopes, post irradiation examination, and so on.

Acknowledgements

This work was supported by the Korea government (MSIT) (1711078081).

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