

Formation of Basis for Nuclear Energy R&D, and Creation of Innovative Technology

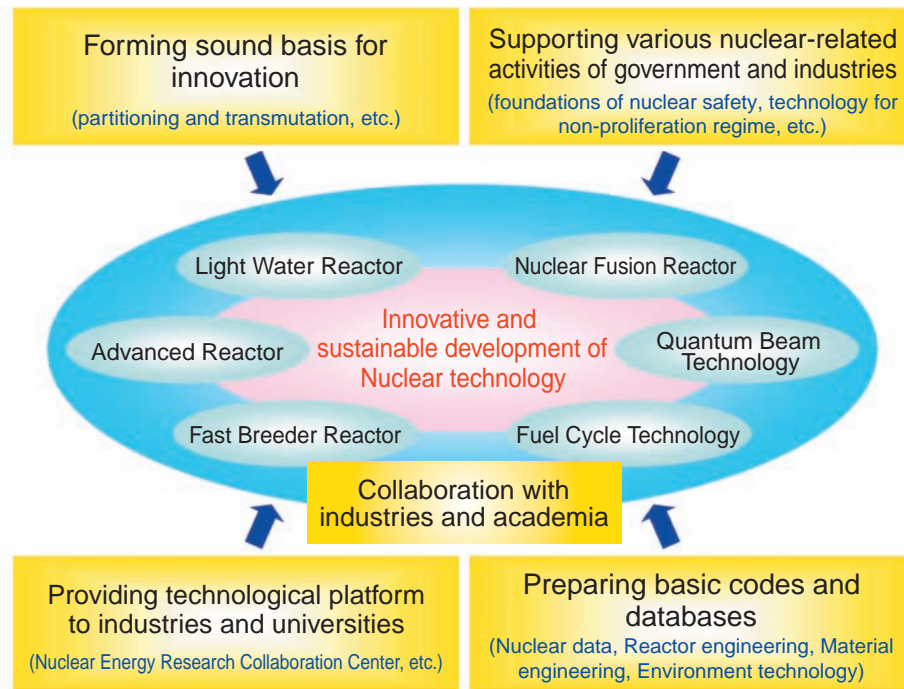


Fig.8-1 Roles of nuclear science and engineering research

The R&D activities in nuclear science and engineering research at the Japan Atomic Energy Agency comprise the four roles shown in Fig.8-1. To this end, research is being conducted in the areas of nuclear data and reactor engineering, fuels and materials engineering, and environment and radiation science. JAEA has been also promoting joint research and development with industry and academia, and the Nuclear Engineering Research Collaboration Center (NERCC) was established in 2005 to support these activities.

Nuclear data and reactor engineering

Measurements of nuclear cross-section data and compiling the data into an evaluated database (JENDL-4.0) are the major research activities in this field. Reactor physics and heat transfer are also studied. Most of the R&D activities on partitioning and transmutation to reduce the burden in the geological disposal of high-level waste (HLW) are conducted in this research field.

Fuels and materials engineering

Basic studies on advanced nuclear fuel and cycle technology (Fig.8-2) and on the various nuclear materials are included in this field. Study of vitrification processing of high-level radioactive liquid waste is also ongoing, including some activities at NERCC to assist with commercial plant operation.

Environment and radiation science

R&D on the environmental behavior of radionuclides and dose assessment is being pursued. Studies on radiation protection are also included in this field. Some of this research has been applied to more familiar issues, such as the study of carbon release from soil using carbon-14 isotopes for better understanding of the greenhouse effect, and development of a new technology for liquid waste treatment based on nuclear waste management.

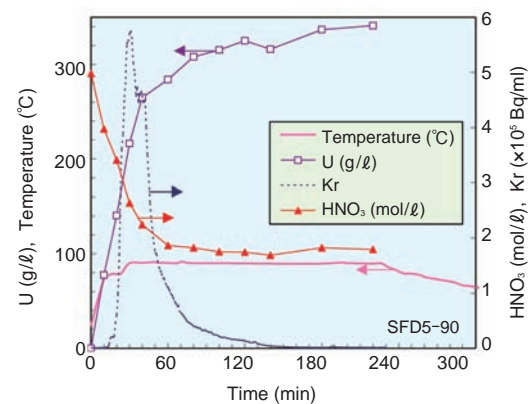


Fig.8-2 Changes in temperature and composition of working solution, and release behavior of Kr during MOX dissolution

The Handbook on Process and Chemistry of Nuclear Fuel Reprocessing containing these data is also published via the Internet. Frequent access to the website suggests that it has obtained many users including private companies.