The High Temperature Engineering Test Reactor (HTTR) achieved the reactor outlet coolant temperature of 950 °C on April 19, 2004. Research and developments of the High Temperature Gas-cooled Reactor (HTGR) that has merits of supplying high temperature heat, inherent safety features, high thermal efficiency, high burnup of fuel, and so on are particularly important for diversification of energy supply in the future. In addition, progress of innovative basic research is expected by utilizing capacity of the HTGR for irradiation of large-scale test specimens under high temperature conditions.

The HTTR employs Tri-isotropic (Triso) coated fuel particles in the prismatic fuel assembly. Research and development on the HTTR fuel has been carried out spread over about 30 years, in fuel fabrication technologies, fuel performance under normal operation, transient and accident conditions, fission product behavior, and so on. Furthermore, for upgrading of HTGR technologies, an extended burnup TRISO-CFP and an advanced type of CFP, ZrC-CFP in order to keep the integrity at higher operating temperatures has been developed. The present paper provides experiences and current status of research and development works for the HTGR fuel in the HTTR Project. The present status of operation and tests of the HTTR, research on nuclear heat application are also described.