

	Facility/Capability	Description
Thermal hydraulics	Water Thermal Hydraulics Loop (WTHL)	Low-pressure multipurpose water loop with the capability to perform particle image velocimetry (PIV) diagnostics on the SNS target test facility, to test ultrasonic flow meters in metallic pipe lines, to test various nozzle designs for a concave wall gas injection system, and to test pressure drop for various irradiation capsules designs
	Thermosyphon Test Loop (TSTL)	Natural convection water loop for boiling and condensation testing at typical boiling water reactor (BWR) or PWR temperatures and pressures; includes test section design for custom heater configurations; nominal fuel rods are simulated by three 0.5 m long rods of standard outer diameter with electric heaters designed to produce a total of 80 kW (53kW/m, or 16 kW/ft, per rod)
	Liquid Salt Test Loop (LSTL)	A versatile facility for the development and demonstration of high-temperature fluoride-salt technology. Operates at up to 700 °C with a range of instrumentation and control options. Provides infrastructure to deliver up to 250kW of heating power through a nonintrusive, inductive heating technique that can be used for thermal/fluid experimentation, to measure heat transfer characteristics in molten salt-cooled structures such as pebble beds, and to demonstrate the use of SiC as a structural material for use in molten salt systems
Thermal hydraulics	FLiNaK salt purification system	Provides clean salt to be used for research activities by removing water, oxygen and impurities; large-scale system capable of cleaning 160 kg batches of fluoride salts
	FLiBe salt purification system	Provides clean salt to be used for research activities by removing water, oxygen, and sulfur; can accommodate up to 6 kg of salt powder/ up to 3.2 L of liquid FLiBe salt in one batch
	Liquid metal test loop supporting the Target Test Facility (TTF)	Liquid metal loop with an inventory of 20,000 kg of mercury and maximum flow rate of 600 gpm; the low Pr number fluid loop provides infrastructure for heat transfer experiments, two-phase flow He-Hg, instrumentation, surface wettability, natural convection, heat exchangers, among others
	Ultra-high pressure testing	Facilities for testing materials under very high pressure; typical experiments are performed under GPa constant pressures
	Artificial sun	High-density infrared processing, shown to be a cost effective technique for rapid, clean, and non-contact high-temperature processing of materials; facility provides up to 750 kW of power; current applications include processing of refractory materials for fusing and claddings
	Reactive flows	Several ORNL facilities designed to evaluate and optimize processes involving reactive flows such as the Roll-to-Roll (R2R) facility for coating of gas diffusion media, providing infrastructure that can be leveraged for custom solutions to reactive flow problems
	Laser diagnostics and measurements	Validation and verification of CFD codes for engineering problems can be performed by comparing full field measurements, modeling transport species (momentum, mass, energy) using LASER-based diagnostics that provide nonintrusive measurements with high spatial and temporal resolution; PIV and Planar Laser Induced Fluorescence (PLIF) provide simultaneous nonintrusive full-field velocity and temperature measurements, where conventional measurement techniques are usually intrusive and provide single-point readings; visualization of the phenomena provides insight about the problem at hand, and mechanistic models can be improved based on measured quantities
	Advanced Instrumentation	ORNL-developed custom instrumentation solutions for measurement of flow, temperature, and structural data in extreme environments; available facilities to support instrument qualification and calibration in high-temperature molten salt systems and other challenging environments