Facility Factsheet

Power Electronic Components Laboratory (PECS)

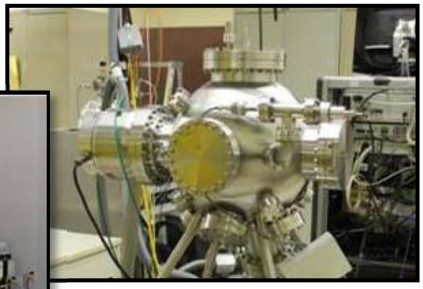
Description:

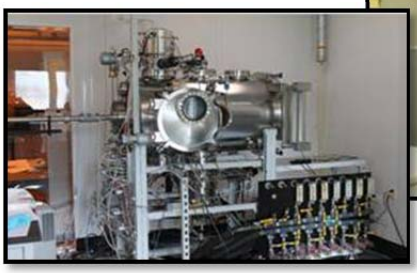
These facilities are used for R&D on advanced power electronic components including power converters, wide bandgap power semiconductor devices, and wide temperature capacitors. Converter efforts include the design, build, and test of advanced circuit designs for applications requiring both high power and efficiency in a wide temperature environment. Wide bandgap semiconductor efforts include research into chip level design and processing issues such as the metal-insulator-semiconductor interface and contact formation. Efforts also include addressing the challenges involved with the packaging of electronics for optimal heat transfer configurations under wide temperature operating conditions. There are two main capacitor focus areas. The first deals with the modeling, evaluation, simulation, and demonstration of wide temperature capacitors for use in wide temperature power electronics systems. The second deals with the fundamental materials investigation and development of dielectrics for wide temperature capacitor applications. The facilities are equipped with a power electronics fabrication and test area. The microelectronics fabrication facilities include contact photolithography capabilities, a reactive ion etcher, thermal oxidation furnace, a rapid thermal anneal system, e-beam deposition system, RF sputter deposition system, atomic force microscope, SEM, and an atomic layer deposition system. The capacitor facilities are equipped with pulsed DC sputtering systems, a thermal evaporator, and a complete capacitor and dielectric evaluation area with state of the art wide temperature testing capabilities including a newly developed rapid thermal testing capability which will allow for temperature cycling from -50°C to 300°C in under 10 minutes.

Purpose:

Perform R&D on power systems/components for air and space vehicles and directed energy weapon systems in the areas of:

- Wide bandgap power semiconductor devices
- High energy density capacitors
- Novel power electronic conversion systems
- Wide temperature environmental operation





Products:

Capacitors
Power Semiconductors
Power Converters
Robust Packaging and Integrated Cooling

Availability:

Primarily in-house research, U.S. Government agency use, DoD contractors and dual use/defense conversion use-limited on an as available basis.