

# Ceramic Processing

## Manufacturing Technologies

The Ceramics and Glass Department develops fabrication processes for ceramic components used in weapon applications. All phases of ceramic processing, from powders to finished products, are addressed; including powder processing, blending, granulation, compaction, sintering, grinding, metallization, and property measurements. In addition, multilayer processing techniques are used to fabricate layered electrical devices. Our department has extensive experience in ferroelectric (PZT) and alumina ceramics, including cermet compositions (alumina – molybdenum composites) developed for hermetic electrical feedthrus, and alumina ceramics with buried ruthenium oxide based resistors.

### Capabilities

- Perform process development activities for prototype fabrication or to scale-up laboratory research processes
- Develop multi-layer ceramic-metal devices based on the tape casting of thin (0.001 to 0.080 in.) flexible ceramic layers and associated thick film technology
- Employ powder consolidation methods such as compaction (both uniaxial and isostatic) and slip casting to shape form ceramic parts



Cermet Components



- Precision slice and grind ceramic components
- Fabricate hermetic, electrically conductive, ceramic-metal (cermet) feedthrus in alumina ceramic

### Resources

- Twin shell blenders for powder blending, binder addition, and granulation
- Automatic uniaxial presses
- Isostatic presses (to 30,000 psi)
  - Furnaces (to 1650° C)
- Multilayer ceramic processing facility
- Precision surface grinders, lappers, and slicing equipment
- Secure facility for processing classified components



*Twin-shell blender for powder granulation and binder addition*

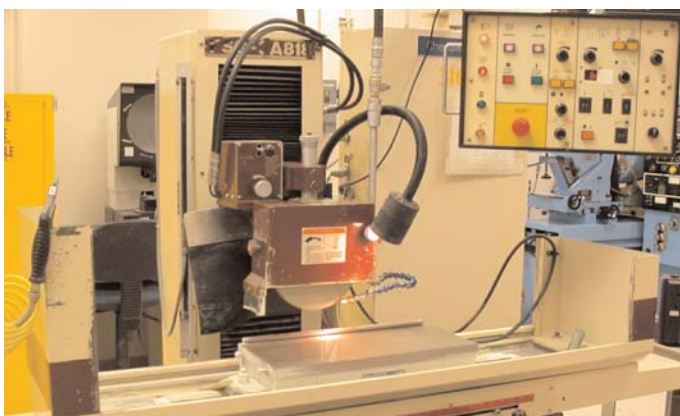
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### **Accomplishments**

- In 1997, the department transferred the technology for electrically conductive cermets to industry.
- Since 1999, the department has been qualified to manufacture cermet components for WR applications.
- In 2001, the staff scaled up powder granulation, compaction, and sintering processes to meet future WR needs for PZT ferroelectric components.



*Precision surface grinder*

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