



Thermal Measurement Workshop: Expected Course Outline

Elevate Your Expertise in Thermal Analysis Techniques and Equipment

Are you involved in the field of materials science, engineering, or quality control? Do you strive to enhance your technical skills and stay at the forefront of industry innovations? Join us at the Orton Ceramic Foundation for an exclusive Thermal Measurement Workshop in Westerville, Ohio. This workshop is designed for professionals and researchers who wish to deepen their understanding and application of thermal analysis.

Course Description

Insightful Lectures and Practical Sessions: The two-day workshop features a series of expert-led lectures that delve into critical aspects of thermal behavior in materials. For each topic listed below, relevant background theory, application to ceramic materials, and measurement techniques will be covered.

- **Thermal Stability:** Learn how to use basic thermodynamic and chemical principles to predict service temperatures of ceramic materials.
- **Heat Capacity:** Apply the basic quantum mechanics models of Einstein and Debye to predict the heat capacity of ceramic materials.
- **Thermal Conductivity:** Understand how phonon and photon mechanisms control the thermal conductivity of ceramic materials.
- **Thermal Expansion:** Learn how bonding and potential energy control the dimensional changes that ceramic materials undergo as a function of temperature.

Who will benefit from this course?

- Professionals in R&D, manufacturing, and quality control across various industries, including ceramics, metallurgy polymers, and composites.
- Academic researchers and professionals specializing in materials science and related disciplines.
- Anyone looking to enhance their technical skills in thermal analysis and measurement.

<u>Class Dates</u>	<u>Topics / Activities During Class</u>
1) 08/19/2025	Thermal Stability <ul style="list-style-type: none"> • Definition • Thermodynamic Principles • Chemical Bonding • Application to Ceramics and Refractories Heat Capacity <ul style="list-style-type: none"> • Definition • Dulong and Petit Model • Einstein Model • Debye Model • Electronic Contributions



	<ul style="list-style-type: none"> • Structural Aspects • Application to Ceramics and Refractories • Measurement Techniques <p>Thermal Conductivity</p> <ul style="list-style-type: none"> • Definition • Phonon Conductivity • Structural Aspects of Phonon Conductivity • Photon Conductivity • Structural Aspects of Photon Conductivity • Application to Ceramics and Refractories • Measurement Techniques <p>Thermal Expansion</p> <ul style="list-style-type: none"> • Definition • Bonding and Potential Energy • Equation of State of Solids • Structural Aspects of Thermal Expansion • Application to Ceramics and Refractories • Measurement Techniques <p>Hot Disk</p> <ul style="list-style-type: none"> • Introduction • Theory
2) 08/20/2025	<ul style="list-style-type: none"> • Hot Disk Theory • Practice for measuring thermal conductivity • Thermal diffusivity • Heat capacity • Sample testing • Orton tours • Laboratory Demonstrations