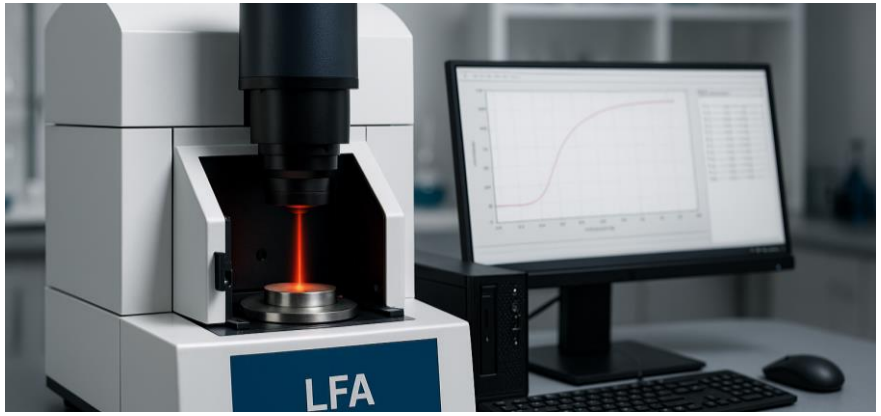
Technology Offer CSIC/PT/074

High-Precision Thermal Measurement in Ultrathin Layers: Optimized LFA Solution



Modified and optimized procedure for measuring thermal conductivity using LFA (Laser Flash Analysis). Includes software that enables precise measurement of thermal conductivity in ultrathin material layers (<0.1 mm)

Intellectual Property

Trade secret

Stage of development

Technology ready for industrial implementation

Intended Collaboration

Licensing and/or co-development

Contact

Patricia Thomas Vielma, PhD

Vice-presidency for Innovation and Transfer

patricia.thomas@csic.es
comercializacion@csic.es

Market need

The growing development of microelectronic devices, functional coatings, and energy systems demands the precise characterization of thermal conductivity in ultrathin films (<0.1 mm) with maximum accuracy, high speed, and reproducibility. Existing solutions often suffer from spurious signals, limitations in temporal resolution, and measurement errors, which delay the optimization of industrial and laboratory-scale processes and hinder innovation in new materials. There is a need for technology that delivers reliable real-time results, simplifies data management, and accelerates the development of applications in semiconductors, batteries, thermoelectrics, and coatings.

Proposed solution

The developed technology includes a novel sample preparation procedure that ensures the thermal response recorded corresponds solely to the sample itself, preventing any contributions that could distort experimental results when irradiated with the laser. The custom-developed software enables fitting of the experimental curve and extraction of the material's thermal conductivity. Once the appropriate parameters are determined, a set of optimized logistical guidelines is provided for creating and adjusting specific heat capacity and density files, as well as for managing the data generated by the program.

Competitive advantages

- Easy implementation and adaptability to LFA-type measurement equipments.
- Allows for maximizing and isolating the sample's contribution/signal.
- Enables the acquisition of more accurate temperature-time curves in less time.
- Enables precise measurement of thin films, including those with thicknesses under 0.1 mm.