

Thermal Diffusivity Determination of Liquid Trough Thermal Diffusion Length Measurement.

ABSTRACT

A new Optical Fiber Thermal Wave Resonance Cavity (OF-TWRC) technique was used to determine thermal diffusivity of liquids from the thermal diffusion length obtained from the curve of pyroelectric amplitude exponential decay with respect to cavity length and compared with the linear fitting of pyroelectric phase signal. The average thermal diffusivity of water obtained by this calculated method gives the value for water as $1.4723210\text{cm}^2\text{s}^{-1}$. The thermal parameters for water and for other liquids agree with reported values in the literature.

Keyword: Thermal wave; TWRC technique; Thermal diffusivity; Optical fiber.