

## **Measurement of thermal diffusivity of Malaysian wood using photoflash and photoacoustic techniques**

### **ABSTRACT**

Two experimental arrangements have been used to measure the thermal diffusivity at room temperature for ten species of Malaysian wood using photoflash and photoacoustic (PA) techniques. Both use circular disc samples with thickness 1 to 2 mm and 100 to 200  $\mu$ m respectively. In the photoflash experiment, a flash pulse is irradiated onto the front surface of the sample. The time dependence of the temperature response at the back surface of the sample is measured using a K-type thermocouple. On the other hand, the PA experimental configuration uses a closed photoacoustic (PA) cell that serves as a pressure sensor as well as an acoustic chamber. It is based upon the measurement of the acoustic signal as a function of the modulation frequency in the region where the sample is thermally thick. Both experimental data are then used to calculate thermal diffusivity using appropriate analytical expressions. Scanning electron microscopy (SEM) observation has also been done on both radial and tangential surface of the samples. The results are in good agreement within experimental error, hence validating the experimental measurements.

**Keyword:** Photoflash; Photoacoustic; Thermal diffusivity