A SIMPLE METHOD TO DEFINE THE HEAT CONDUCTIVITY OF A LIMITED PLATE

To the present moment there are a lot of ways to define heat conductivity and thermal diffusivity of solid bodies. The schemes of determining heat conductivity, which use transient methods, usually include a heater and a cooler. The sample is placed in between them. The temperature and temperature differential is determined using several thermocouples.

The authors present a method of determining the thermal characteristics of a sample in the form of a rectangular plate, allowing to apply only one thermocouple, which leads to a simple analytical expression for thermal diffusivity. The described method provides high-precision determination of thermal diffusivity of the body of small size and with the accuracy sufficient for practice — conductivity coefficient. The method uses a simple mathematical model and minimal hardware resources compared to other methods. The exception is the heat-insulating materials. The determination of their thermal conductivity using this method can lead to poor accuracy.

Key words: heat conductivity, thermal diffusivity, specific heat, rectangular plate, one-dimensional temperature field.

References
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