

Abstract

This paper proposes a simple and fast method to identify the normal absorptance of various surfaces submitted to a radiation source, using inverse techniques. The method consists of imposing during a lap of a few seconds a radiative flux on the front face of a sample whose absorptance is to be identified. The time-dependent temperature on the rear face is measured, and the procedure of inversion is implemented to give a time function of absorbed flux. Only one time-temperature function is measured using a current type K thermocouple. The normal absorptance of the front face is obtained by comparing the time heat flux function of the source and the identified absorbed heat flux function. This method can be quickly and efficiently adopted for many practical applications without the need to use optical devices, which give accurate measurement but at substantial cost. The inverse technique using a conjugate gradient method of minimization with adjoint problem is implemented to estimate the absorbed heat flux. In order to achieve good values of radiative absorptances, reliable knowledge of thermal diffusivities and adequately manufactured samples are required