EXPERIMENTAL STUDY OF INVERSE HEAT CONDUCTION PROBLEM IN A KINETIC HEATING FACILITY

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Abstract

Estimation of unknown surface conditions using measured temperature time history inside or back wall of a solid body is known as inverse heat conduction problem. The purpose of present paper is to solve inverse heat conduction problem using iterative method in conjunction with measured thermocouple data. Exact solution of one-dimensional heat conduction equation is obtained to calculate temperature distribution inside a finite slab. An analytical expression of the sensitive coefficient is derived for constant wall heat flux. It is observed that the sensitive coefficient varies linearly with wall heat flux. Experiments were conducted in Kinetic Heating Facility to obtain temperature-time data. The facility works employing with close loop feed-back system with thyristor controlled thermac. Experimental results are compared with the estimated values and are found in good agreement. The Kinetic Heating Facility can easily be adopted to estimate the thermal diffusivity of material.