



Method for Measuring Thermal Conductivity of Small Samples Having Very Low Thermal Conductivity

By Robert A. Miller

BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 34 pages. Dimensions: 9.7in. x 7.4in. x 0.1in. This paper describes the development of a hot plate method capable of using air as a standard reference material for the steady-state measurement of the thermal conductivity of very small test samples having thermal conductivity on the order of air. As with other approaches, care is taken to ensure that the heat flow through the test sample is essentially one-dimensional. However, unlike other approaches, no attempt is made to use heated guards to block the flow of heat from the hot plate to the surroundings. It is argued that since large correction factors must be applied to account for guard imperfections when sample dimensions are small, it may be preferable to simply measure and correct for the heat that flows from the heater disc to directions other than into the sample. Experimental measurements taken in a prototype apparatus, combined with extensive computational modeling of the heat transfer in the apparatus, show that sufficiently accurate measurements can be obtained to allow determination of the thermal conductivity of low thermal conductivity materials. Suggestions are made for further improvements in the method based on...



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