A Simple Test Method for Assessment of the Interface Thermal Resistance

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Minimizing the interface thermal resistance is crucial in several applications such as electronics cooling, or battery cell cooling in electric vehicles. Different thermal interfacing materials and solutions are available to achieve a properly low thermal resistance between cooled devices and heat sinks, however they are sensitive to application, pressure, temperature and other variables, so a test method for comparative and, possibly, quantitative assessment of performance would be desirable. In order to have a reasonable estimate of the interface thermal resistance, an easy to use measurement approach has been tested. This consists of contacting a cold and a hot samples of metals with known thermal properties, one at ambient temperature and the other one much hotter, with the tested interface material interposed. The temperatures of the two samples, assumed to be in each one uniform, are measured by thermocouples placed inside the samples through a hole, and the interface resistance is calculated from the time evolution pattern of those temperatures during the thermal transient that follows the instant in which the samples have been contacted. Potentialities and limitations of the method are analyzed