

APPLICATION SHEET

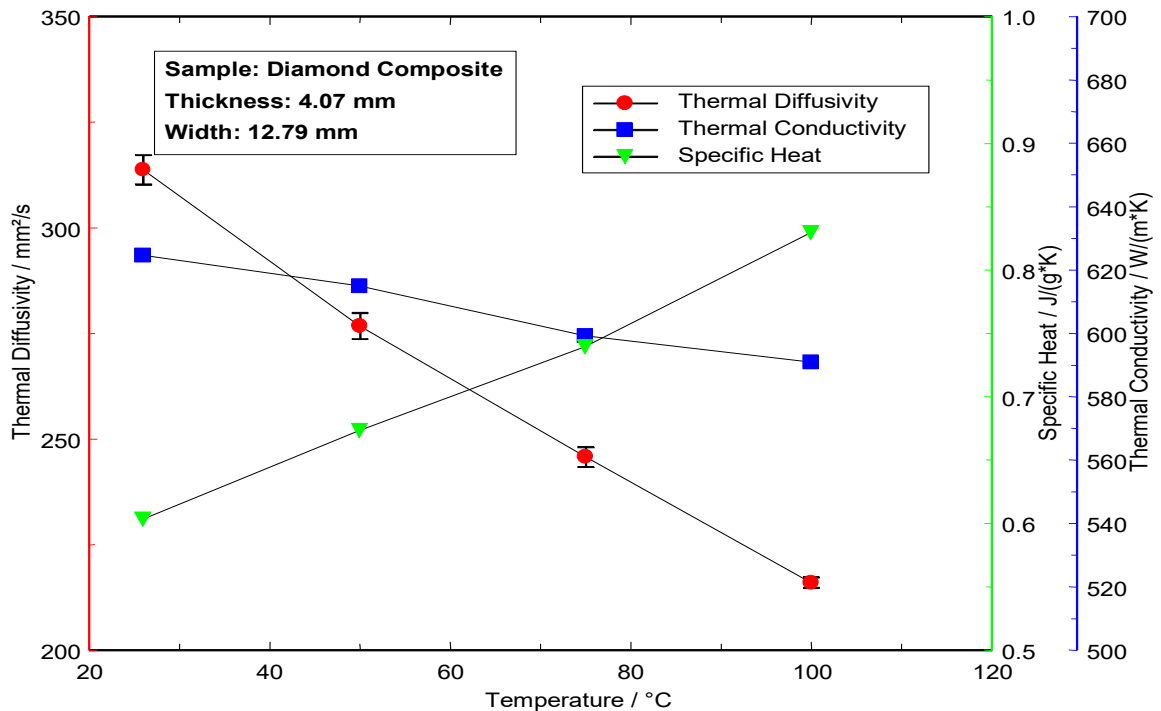
Ceramics/Electronics
LFA 447 NanoFlash™

Ceramic-Diamond Composite

Introduction

The production of effective heat sinks is one of the key problems in the modern microelectronics industry. The best material for such an application would be diamond, but the price for larger diamond parts is extremely high. Small diamond grains, on the other hand, can be industrially

produced at an acceptable price level. Therefore, researchers all over the world try to develop composites offering a better thermal conductivity compared to pure metals (silver or copper, thermal conductivity around 400 W/(m·K)). Due to wetting problems, metals can generally not be used as a matrix material in this case. Another possibility would be to use highly conducting ceramics like a matrix.



Test Conditions

Temperature range: RT ... 1000°C
Sample holder: 12.7 mm diameter
Sample thickness: 4.07 mm
Sample surface preparation: Graphite coating
 c_p from LFA, standard: POCO Graphite

Test Results

Using a ceramic matrix material, the thermal conductivity between the ceramic and diamond can be achieved. The measured results are higher than the typical values for pure metals (copper approx. 406 W/mK) often used as a heat sink in electronics packaging. The example clearly demonstrates that the LFA 447 can analyze highly conducting materials without any problems (differences between the LFA 427 and LFA 447 were less than 2%).