

# APPLICATION SHEET

## Importance of the Sample Geometry – LFA 467 *HyperFlash*

### Specific Heat Determination – Good Reproducibility of a Wide Range of Sample Thickness

The LFA 467 *HyperFlash* can measure the thermal diffusivity of up to 16 samples with different dimensions. Additionally, it is able to calculate the samples' specific heat ( $c_p$ ).

As the LFA 467 *HyperFlash* comes with a variety of sample holders for different sample geometries and thicknesses, the question arises:

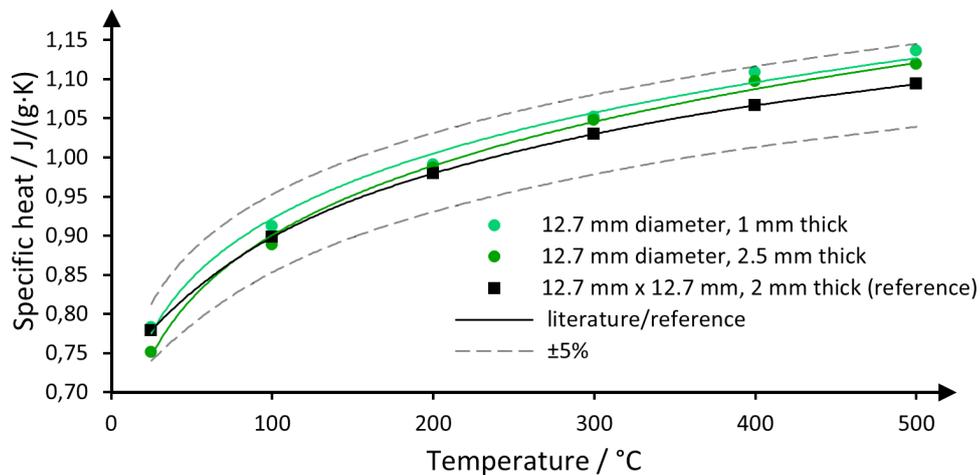
#### Which sample thicknesses can be compared to achieve best specific heat results?

This question shall be answered with the following measurements where Pyroceram 9606 was used as sample

material. For the investigation of the influence of the sample thickness on the  $c_p$  result, Pyroceram samples with different thicknesses were tested:

| Diameter/Square area | Thickness |
|----------------------|-----------|
| 12.7 mm              | 1 mm      |
| 12.7 mm              | 2.5 mm    |
| 12.7 mm x 12.7 mm    | 2 mm      |

The *ZoomOptics* (hardware option) was set to a spot size of 7 mm on each sample allowing for comparison of the test results.



Influence of the sample thickness on  $c_p$  comparison

As  $c_p$  reference, a 2 mm thick sample (12.7 mm x 12.7 mm) was used (black curve). The other two samples tested (light and dark green curves) provided the basis for the  $c_p$  calculation.

Slight deviations between the samples appear due to the different temperature spreading. But despite nearly double the thickness and the different geometry of the reference material compared to the light green sample, it can clearly be observed that the results are in very good agreement

(within  $\pm 5\%$ ) over the entire temperature range.

As a matter of fact,  $c_p$  determination is furthermore influenced by the sample geometry and thickness; the results obtained, however, show that  $c_p$  determination can be carried out on different samples sizes and shapes as long as the differences between the samples are not too big. In order to achieve best results, samples of the same geometry and a maximum thickness difference of 1 mm should be used for  $c_p$  comparison.