

# APPLICATION SHEET

Polymers · Polymer Manufacturing  
LFA 447 NanoFlash®

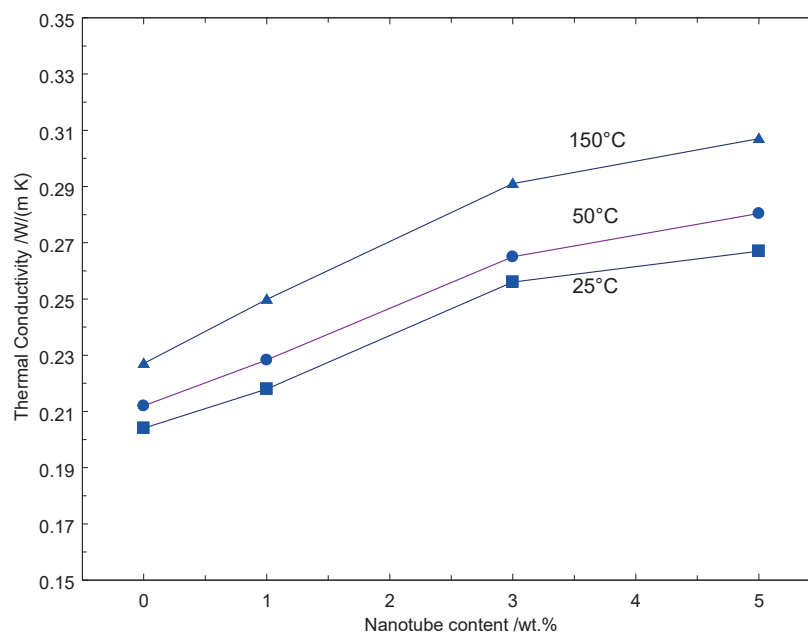


## Polypropylene with Carbon Nanotubes (CNT)

### Introduction

The use of nanoparticles in a polymer matrix offers a broad range of possibilities to control the mechanical and thermophysical properties of polymers for the later application. The influence of carbon nanotubes (CNT) on the thermal conductivity is investigated by LFA measurements and shown in this application sheet.

Polypropylene samples with different contents of CNT were tested from room temperature to 150°C. The thermal conductivity was calculated by multiplying the measured values for the bulk density, specific heat and thermal diffusivity.



### Test Conditions

Temperature range: 25 ... 150°C  
Sample holder: 12.7 mm diameter  
Sample thickness: 1 mm  
 $c_p$  from LFA, standard: Pyroceram

### Test Results

The thermal conductivity increases with temperature as expected for samples with amorphous structures (amorphous and semicrystalline). Significant differences were detected depending on the CNT content. Up to 3 wt.%, a small increase in CNT content leads to a high increase in thermal conductivity. Above 3 wt.%, this dependency decreases. The example clearly demonstrates that the LFA method yields reliable values to investigate the influence of nanotubes within a polymer matrix.