

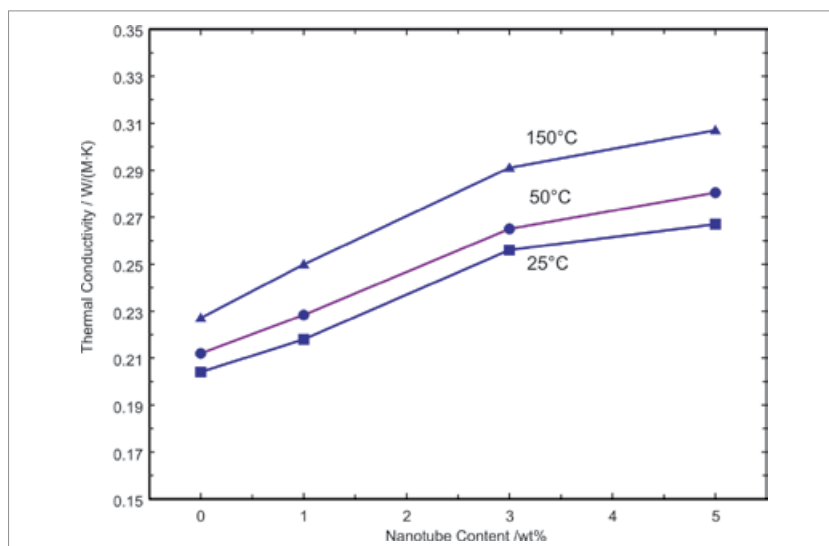
APPLICATION SHEET

POLYMERS – POLYMER MANUFACTURING

POLYPROPYLENE WITH CARBON NANOTUBES (CNT)

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 are

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



Instrument

LFA 457 *MicroFlash*®

Test Conditions

Temperature range	25 ... 150°C
Sample holder	12.7 mm
Sample thickness	1.000 mm
c_p from LFA, standard	Pyroceram

Results

The thermal conductivity increases with temperature as expected for samples with amorphous structures (amorphous and semi-crystalline). Significant differences were detected in dependence on the CNT content. Up to 3 wt.%, a small increase of the CNT content leads to a high increase of the 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.