

Thermal Conduction in Transparent Carbon Nanotube Films

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Using materials with high thermal conductivity is a matter of great concern in the field of thermal management. In this study, we present our experimental results on an important physical property of carbon nanotube (CNT) films, two-dimensional thermal conductivity obtained by using an optical method based on Raman spectroscopy. We prepared four kinds of CNT films to investigate the effect of CNT type on heat spreading performance of films. This first comparative study using the optical method shows that the arc-discharge single-walled carbon nanotubes yield the best heat spreading film. And we observed thermal conductivity values of CNT films with various transmittances and found that the Raman method works as long as the sample is a transparent film. This study provides useful information on characterization of thermal conduction in transparent CNT films and could be an important step toward high-performance carbon-based heat spreading films.

Keywords: Thermal conduction, Carbon nanotube film, Raman spectroscopy