

Heat sink based on layer-by-layer assembled carbon nanotube /graphene composite

김윤영, 하현철, 황선주, 채지혜, 박민영, 이예인, 정수환†
경북대학교
(shjeong@knu.ac.kr†)

High density integration of electronic devices in the electronic systems is indispensable. This trend has led to high power consumption of devices and limited the performance of electronic devices. Most important property which determines the performance of heat sink is thermal conductivity.

Inspired by the outstanding thermal conductivity of carbon based nanomaterials including carbon nanotubes (CNTs) and graphene, we report novel heat sink prepared by layer-by-layer (LBL) deposition of CNTs and graphene.

Our strategy began with functionalization of CNTs and graphene for subsequent LBL process. Functionalized graphene with negative charge was sequentially built up on the Cu heat sink in alternation with positively charged CNT via electrostatic interactions. To compare the heat dissipation effect with commercialized Cu heat sink, the CNT/graphene composite based heat sink and Cu heat sink were attached to thermal heat source. Temperature of opposite side was recorded with time. Difference of temperature between CNT/graphene coated heat sink and bare heat sink was 21 °C, indicating the CNT/graphene composite heat sink remarkably outperformed the commercialized Cu heat sink.