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HEAT TRANSFER MODELING TO IMPROVE THE LIFESPAN OF LED BY AL/CU COMPOSITE HEAT SPREADER

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LEDs are known as more environmental than incandescent bulbs and fluorescent lamps. In addition, LEDs are smaller, durable, longer in life, brighter in brightness and much lower in power consumption compared to bulbs and fluorescent lamps. The LED structure is very weak against heat. Therefore, heat dissipation performance is one of the most important consideration of LED. The heat sink is mostly made of Al series in the market due to light weight and excellent thermal conductivity. However, as the output of the LED increases, existing heat-dissipating materials are facing the limit. Hence, the focus of this study was on improving the efficiency of LED by changing the thermal conductivity characteristics of the heat sinks using Al/Cu composite instead of Al heat- dissipating material. The cooling efficiency of the LED is depended on what the TIM material is used. So, we calculated the cooling efficiency of LED according to this TIM material through computer simulation and compared the LED lifetimes of Cu, Al and Al/Cu composite heat- dissipating materials. Ansys-CFX was used to calculate the cooling efficiency of the LED according to TIM thermal resistance, the output of the LED and the ratio of Al/Cu composite.

BIOGRAPHY

Dong-Hee Lee has completed his graduation in Advanced Material Engineering from Hanbat University (Republic of Korea). After graduation, he has started to study Material Science Engineering in the Graduate School of Chungnam National University. Especially, computational modeling is primary study field. Heat transfer modeling has been performed to enhance cooling efficiency of LED.

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