TECHNOLOGY OFFER

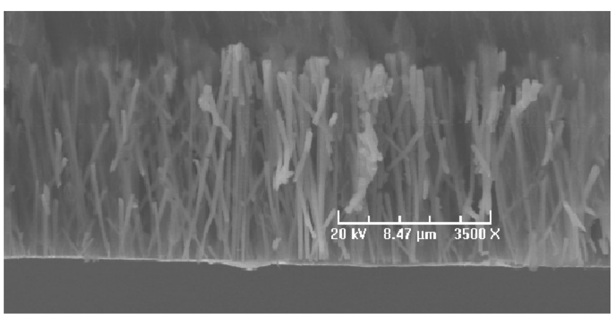
Nano-composite Thermal Interface Material (NTIM)

Abstract

Thermal Interface Materials (TIM) are normally used to reduce air pockets and gaps between die and heat spreaders or heat sinks. Often the TIM itself has a thermal resistance of up to 50% of the total resistance of the path between heat source and ambient. We have fabricated an electrically conducting thermal interface material (TIM) composite film that has thermal impedance of 0.6×10^{-4} °Cm^2W^{-1}.

Innovative Aspects

The NTIM technology is targeted at high heat flux applications: from computing to power devices. The key innovation in the technology is the creation of aligned high density nano-structures in polymer templates - to give both low contact resistance and high bulk thermal conductivity.



Cross section of thermal interface material film showing submicron wires

Benefits and Advantages

The NTIM technology offers great advantages over current state-of-the-art technologies:

- Low thermal impedance - 2X improvements over conventional thermal pads.
- Material in film format for ease of handling and cleaning.
- Stable thermal performance in power cycling tests.

The benefit that this technology provides is a lower overall thermal resistance path. This can enable both a lower device operating temperature and higher reliability. In addition higher power dissipation will allow designers to increase device power for the same conditions.

Current State of Development

Electrically conducting TIMs have been developed which have demonstrated enhanced thermal characteristics compared to state of the art TIMs.

IP status

Patent filed.

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