

# PRODUCTION OF COMPOSITE MATERIALS WITH HIGH THERMAL CONDUCTIVITY

**P** PATENTED TECHNOLOGY



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## ABSTRACT

Carbon-based/metal composites are materials showing excellent thermal performance. On the other hand, graphite flakes are attractive carbon based reinforcements in terms of thermal properties, price and machinability. However, their packed preforms pose insurmountable difficulties to metal infiltration.

Here a novel fabrication process is discussed which consists of using mixtures of graphite flakes and other material with different morphology. Preforms of such mixtures can be consolidated through infiltration of a variety of metals and alloys. The resulting material consists of alternating layers of graphite flakes and of a metal matrix composite, and has a high thermal conductivity on the flake plane and a thermal expansion coefficient that, by varying the relative amount of each component, can be tailored to fit the application requirements.

## ADVANTAGES AND INNOVATIVE ASPECTS

The advantages of this new composite material are:

- A thermal conductivity and coefficient of thermal expansion better than that of the components used traditionally (mainly formed by copper or aluminium).
- Competitive production costs.
- The composite material is produced in forms and sizes most appropriate for its subsequent processing (cutting, machining, polishing, etc.) and use.
- The material herewith described is, in addition light and presents no problem for cutting, machining and polishing.

In conclusion, the main innovation aspect of this technology is producing a material suited for simple and low cost manufacturing of heat sinks in the electronics industry.

## MARKET APPLICATIONS

The composite material described can be applied mainly in the semiconductor industry for the manufacture of micro- and optoelectronic devices and power generators.

Additionally, it can be applied in any industrial sector for the manufacture of devices requiring a high thermal cooling capacity.

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COLLABORATION SOUGHT

We are looking for companies interested in acquiring this technology for its exploitation. The research group is also open to other kind of collaboration (patent license agreement, transfer of user, manufacturing or commercializing rights to third parties, etc.).

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