



先進金屬基複合材料

Al-based metal matrix composites

簡介 Introduction

高性能金屬基散熱複合材料，可以依不同目的添加不同強化材，以形成適合特殊需求的複合材料。具有重量輕、熱導係數高及可調整熱膨脹係數等特點，可滿足尖端電子產品與高功率半導體晶片熱管理上的需求。可依客戶需求提供符合嚴謹要求用於散熱等之熱管理用基板。 High performance Al-based MMCs can be designed by adding different reinforce materials to meet specific demands. The MMCs with features such as low weight, high thermal conductivity and tunable thermal expansion coefficient, which can easily meet the thermal management requirements of cutting edge electronics and high power semiconductor chips.

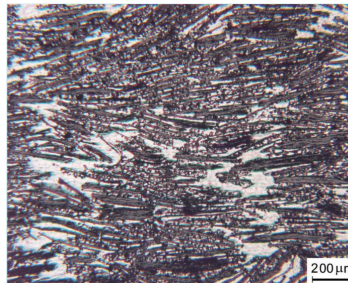
The MMC substrate or heat spreader to specific demands will be available on request.

成果 Accomplishments

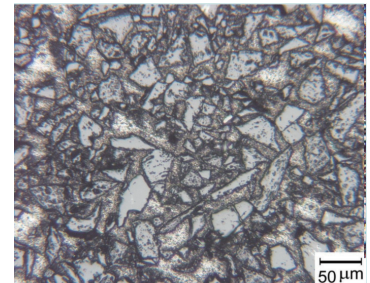
- 石墨系列高性能鋁基複合散熱材料，熱傳導係數達 300~500 W/mK；熱膨脹係數約 3~10 ppm/K
Al-graphite composite: thermal conductivity about 300~500 W/mK; coefficient of thermal expansion about 3~10 ppm/K
- 陶瓷系列高性能鋁基複合散熱材料，熱傳導係數達 170~200 W/mK；熱膨脹係數約 7~12 ppm/K
Al-ceramic composite: thermal conductivity about 170~200 W/mK; coefficient of thermal expansion about 7~12 ppm/K

Physical properties of Al-based composites

Sample Designation	Density (g/cm ³)	Diffusivity (mm ² /s)	Conductivity (W/m ² K)	CTE (ppm/K) 20~100°C
石墨系 鋁基複合材料 Al-graphite	2.3~2.5	30~100 (⊥)	70~250 (⊥)	-
		150~300 (∥)	300~500 (∥)	3~10
陶瓷系 鋁基複合材料 Al-ceramic	2.9~3.1	80~95	170~200	7~12
Cu	8.9	110	380	16.5
Al	2.7	86	200	24



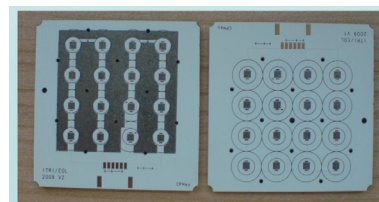
石墨系鋁基複合材料微結構
Al-graphite composite microstructure



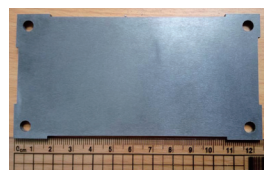
陶瓷系鋁基複合材料微結構
Al-ceramic composite microstructure

應用 Applications

- 高功率 LED 散熱基板
High-Power-LED thermal-dissipation substrate
- 高功率電子半導體散熱片
High-Power-semiconductor heat sink
- 高功率電力電子控制晶體 (IGBT) 散熱基座
IGBT cooling baseplate
- 高功率半導體晶片均熱片
High-Power-semiconductor thermal spreader



高功率 LED 散熱基板
High-Power-LED
thermal-dissipation
substrate



AlSiC 複材 IGBT 散熱底版
IGBT (Insulated Gate Bipolar Transistor)
Cooling baseplate made of
AlSiC composites

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