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TITANIUM ALLOY FAN HOUSING

HP INC

Titanium Alloy Fan Housing

Abstract

This invention is to develop titanium alloy fan housing and obtain light weight, high tensile strength and thin thickness by replacing thicker, heavier and poor tensile strength stainless steel or plastic fan housing. In addition, thinner titanium alloy fan housing offers more space in laptop or tablet enclosures to enhance heat dissipation.

Background

Traditionally, plastic and stainless steel materials are used to fabricate fan housing, which has thicker, heavier, and poor tensile strength fan housing.

Invention Description

Thin graphene deposition layer (10-50 nm) on titanium plate by physical vapor deposition (PVD) can provide high performance heat dissipation through heat spreading and thermal radiation mechanism to reduce heat induced from fan shaft during the fan rotation as shown in Figure 1. The measured thermal conductivity of graphene is in the range 3000 - 5000 W/mK at room temperature.

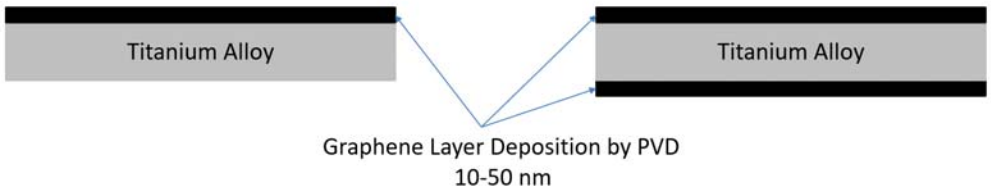

Figure 1. Graphene Layer Deposition on Titanium Alloy by PVD

Advantages of Titanium Alloy Fan Housing

The advantages of titanium alloy fan housing are as follows:

Fan Housing	Titanium Alloy	Stainless Steel	Plastic
Density	4.506 g/cm³	7.7 g/cm³	0.92 g/cm³
Thickness	0.2-0.3 mm	0.4-0.5 mm	1.2 mm
Volume (50x50xT mm)	0.5-0.75 cm³	1-1.25 cm³	3 cm³
Weight	2.25-3.38 g	7.70-9.63 g	3.6 g
Tensile Strength	800-1400 MPa	500-750 MPa	28-70 MPa (PC/ABS)

- Titanium alloy fan housing can obtain light weight, high tensile strength and thin thickness.
- Replace thicker, heavier and poor tensile strength stainless steel or plastic fan housing with titanium alloy fan housing.
- Offer thinner fan housing design with titanium alloy (0.2-0.3 mm) compared to stainless steel (0.4-0.5 mm) and plastic (1.2 mm) materials.
- Thinner titanium alloy fan housing offers more space in laptop or tablet enclosures to enhance heat dissipation, resolve hot spot issues, and extend the lifetime of LCD panel, LED, PCB, CPU and battery.
- Titanium alloy fan housing provides a light weight solution in comparison with stainless steel (7.70-9.63 g) and plastic (3.6 g).
- Titanium alloy has the best tensile strength 800-1,400 MPa compared to stainless steel and plastic materials.

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