Patent Search

Invention Title	APPARATUS AND METHOD FOR DEVELOPING A FUNCTIONALLY GRADED MATERIAL (FGM)
Publication Number	25/2024
Publication Date	21/06/2024
Publication Type	INA
Application Number	202411043289
Application Filing Date	04/06/2024
Priority Number	
Priority Country	
Priority Date	
Field Of Invention	ELECTRONICS
Classification (IPC)	H01L0021670000, B33Y0030000000, H05B0006120000, B29C0070620000, C08K0009020000

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Abstract:

The present invention relates to an apparatus (100) and a method for developing a Functionally Graded Material (FGM). The apparatus (100) comprises a chamber (10 plurality of heating coils (108), a motion providing means, a dispenser (112) and a solenoid. The chamber (101) comprises of a plate (106) placed inside the chamber (plate (106) adapted to support a thermoplastic polymer. Further, the plurality of heating coils (108) are coupled inside a upper portion (102) of the chamber (101) to h thermoplastic polymer. The dispenser (112) is configured to dispense a solid magnetic filler to the heated and liquefied thermoplastic polymer to form a polymer mix the solenoid is placed inside the lower portion (104) of the chamber (101) to apply a magnetic field on the polymer mixture attaining the higher level to form a functio material. {Figure 1 and Figure 4}

Complete Specification

Description:The present disclosure relates to an apparatus and a method for developing customized structures with graded compositions and properties. More particularly, the disclosure relates to an apparatus and a method for developing a Functionally Graded Material (FGM).

BACKGROUND OF THE INVENTION

[2] Background description includes information that may be useful in understanding the present invention.

[3] A revolutionary development in materials science, Functionally Graded Materials (FGMs) offer a paradigm shift from conventional homogeneous materials to customized structures with graded compositions and properties. Recent years have seen a rise in interest in this novel class of materials because of their exception capacity to combine and optimize a variety of properties, leading to improved performance and multi functionality. Some of the practical applications of FGMs are mentioned below:

? Electromagnetic shielding materials: PMMA matrix adds to the material flexibility and light weight, and the iron component improves its capacity to absorb and reroute electromagnetic radiation, which qualifies it for use in telecommunications and electronics.

? Energy Harvesting Devices: Iron magnetic qualities help to convert mechanical vibrations into electrical energy through magnetostrictive effects, and FGMs can integrated into energy harvesting devices where PMMA offers flexibility.

? Magnetic Bearings: FGMs can be used to create bearings with controlled magnetic properties, reducing friction and wear in rotating machinery.

? Actuators and Sensors: Magnetostrictive FGMs can be used in actuators and sensors where the material's dimensions change in response to a magnetic field

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Page last updated on: 26/06/2019