OPEN ACCESS Freely available online

International Journal of Advancements in Technology

Opinion Article

Influence of Ultrasound Waves on Electrical Properties of Dislocation Engineered Silicon

Davletova Karazhanov*

Department of Mechanical Engineering, Institute for Energy Technology, Kjeller, Norway

DESCRIPTION

Engineered polymer matrix composite substances with fashion dressmaker electric residences are crucial for a myriad of engineering programs together with bendy electronics, electromagnetic shielding, and substances with embedded electric wiring. However, present fabrication strategies are confined way of means of material desire and dimensional scalability. We use the radiation pressure related to a status ultrasound wave area to spatially set up and align electrically conductive microfibers dispersed in a photopolymer matrix in user-unique orientations and use stereolithography to solidify the material. We relate the electrical conductivity of the material specimens to the fabrication process parameters, including ultrasound transducer power, microfiber alignment, and microfiber weight fraction. Logistic regression assessment demonstrates that the electrically conductive composite material specimen with increasing parameters like microfiber weight fraction and alignment will has the opportunity to force the formation of percolated network of electrically conductive microfibers. The conductivities of the conductive samples ranged from 31 to 793 S/m, indicating that the producing technique parameters are critical in predicting whether or not the composite samples can be conductive or insulating. The relationship between composite fabrication process parameters and the resulting electrical conductivity is a key step in the fabrication of polymer matrix composites with designed electrical properties for use in engineering applications. The combined ultrasonic DSA and SLA manufacturing process works independently of the fiber and matrix material properties and facilitates dimensional scalability due to the low attenuation of ultrasonic waves in viscous media.

Polymer matrix composites consist of a polymer matrix and one or more continuous or discontinuous filler materials. Continuous fillers (such as fiber tows) typically span the entire length of the composite sample and align under mechanical stress during the manufacturing process, acting as mechanical reinforcement for the polymer matrix. Discontinuous filler materials can consist of micro or nano-sized particles such as microfibers, microrods, nanofibers, Carbon Nanotubes (CNT), or spherical particle powders. They are either randomly distributed within the polymer matrix or aligned in specific patterns. Changing the material properties, weight fraction, and orientation of the discontinuous filler material within the polymer matrix affects the bulk properties of polymer matrix composites and their interaction with external fields (electrical, magnetic, force fields, etc.) and increase. These materials can be engineered to exhibit a variety of properties, including thermal, mechanical, or electrical design properties. This work focuses specifically on electrical conductivity or electrical resistance. For example, aligning conductive filler materials in composite matrices can serve as embedded electrical wiring, useful in a variety of engineering applications such as flexible electronics, chemical or biological sensors, and strain sensors.

Determine the electrical conductivity of a polymer matrix composite material from electrical resistance measurements. This depends on the electrical properties of the matrix and filler materials, as well as the concentration, size and orientation of the filler materials within the matrix material. There are several methods to quantify the electrical resistivity of discontinuously filled polymer matrix composites. DC potentiometers allow accurate high resistance measurements, but are typically only over 103 ohms and are not suitable for conductors. Impedance analyzers measure impedance as a function of frequency and are typically used in AC electrical conductivity measurements. The parameter analyzer measures DC current as a function of voltage level (maximum 10 V), suitable for conductors and semiconductors.

Fabrication of polymer matrix composites with designer electrical properties or embedded electrical leads requires the creation of permeated networks of aligned filler materials that allow electrical flow between different locations within the material. The percolation threshold is defined as the minimum weight fraction of discontinuous packing material that forms long-range connections in the material sample. An array of uniformly distributed discontinuous packing materials reduces the percolation threshold compared to random or isotropic arrays.

Correspondence to: Davletova Karazhanov, Department of Mechanical Engineering, Institute for Energy Technology, Kjeller, Norway, Tel/Fax:+200 019 6175; E-mail: davlekarazhanov@ife.no

Received: 24-Oct-2022, Manuscript No. IJAOT-22-20338; **Editor assigned:** 28-Oct-2022, Pre Qc No. IJOAT-22-20338 (PQ); **Reviewed:** 11-Nov-2022; Qc No. IJOAT-22-20338 **Revised:** 18-Nov-2022, Manuscript No. IJOAT-22-20338 (R); **Published:** 25-Nov-2022, DOI: 10.35248/0976-4860.22.13.213.

Citation: Karazhanov D (2022) Influence of Ultrasound Waves on Electrical Properties of Dislocation Engineered Silicon. Int J Adv Technol. 13:213.

CONCLUSION

Discontinuous packing material spatial arrangement and alignment increases the local packing material density and thus the likelihood of individual packing material particles touching, lowering the percolation threshold and increasing the conductivity in the alignment direction. Then increases and decreases the conductivity across the alignment and direction compared to a composite sample containing randomly oriented (conductive) discontinuous filler material. Fabrication of polymer matrix composites using aligned discrete filler materials requires a combination of techniques to form macroscale material sample geometries and methods to spatially position and align the filler materials within the polymer matrix. Traditional manufacturing processes such as molding typically inject a mixture of a liquid polymer matrix and a filler material into the cavity. Alternatively, Additive Manufacturing (AM) processes such as Stereolithography (SLA), Fused Filament Fabrication (FFF), Fused Deposition Modeling (FDM), and Direct Ink Writing (DIW) can be used to create complex free-form geometries layer by layer can be formed.