Electromagnetic Characteristics of Carbon Fiber Powder Embedded in Epoxy Resin

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The electromagnetic radiation absorbing material (RAM) are made of dielectric or magnetic material and which when processed conveniently promote the interference of electromagnetic radiation in a particular frequency band. These materials are used in various industrial areas such as; aerospace, defense, communications and automotive [1,2]. However, the development of these areas, it is necessary to study the material showing properties of absorbing or reflecting electromagnetic radiation in the desired frequency range. Among the materials commonly used in MARE, include: carbonaceous materials, ferromagnetic ceramic oxides and conductive polymers. In contrast, the use of these absorbers centers present as main disadvantage the weight and the volume occupied by the material. However, there are carbon fiber (CF) based RAMs , which have been explored for the purpose of improving the weight of the material, since they are known for their low density, which facilitates its application in the aerospace industry. According this line of reasoning, this study aimed to the production CF for RAM applications in the frequency range of 8-12GHz. In a first step, CF were produced from polyacrylonitrile textile and thermal conversion steps. The second stage of the work is to crush the CF and separate particles in different sizes. The separation resulted in particles of smaller sizes of 25μm and between 25-53μm. After separation of the material samples were produced with CF concentrations of 25 and 50% by volume of matrix (epoxy epocast). Through this study we observed that particulates with 25-53μm with concentration of 25% FC had a 90% attenuation of electromagnetic radiation in the 10-11 GHz frequency range. However, materials with particles smaller than 25μm exhibit only a 20% attenuation of the electromagnetic radiation.