World Academy of Science, Engineering and Technology
International Journal of Aerospace and Mechanical Engineering
Vol:9, No:01, 2015

Response of Vibration and Damping System of UV Irradiated Renewable Biopolymer

Authors : Anika Zafiah M. Rus, Nik Normunira Mat Hassan

Abstract : Biopolymer made from renewable material are one of the most important group of polymer because of their versatility and they can be manufactured in a wide range of densities and stiffness. In this project, biopolymer based on waste vegetable oil were synthesized and crosslink with commercial polymethane polyphenyl isocyanate (known as BF).The BF was compressed by using hot compression moulding technique at 90 oC based on the evaporation of volatile matter and known as compress biopolymer (CB). The density, vibration and damping characteristic of CB were determined after UV irradiation. Treatment with titanium dioxide (TiO2) was found to affect the physical property of compress biopolymer composite (CBC). The density of CBC samples was steadily increased with an increase of UV irradiation time and TiO2 loading. The highest density of CBC samples is at 10 % of TiO2 loading of 1.1088 g/cm3 due to the amount of filler loading. The vibration and damping characteristic of CBC samples was generated at displacements of 1 mm and 1.5 mm and acceleration of 0.1 G and 0.15 G base excitation according to ASTM D3580-9. It was revealed that, the vibration and damping characteristic of CBC samples is significantly increased with the increasing of UV irradiation time, lowest thickness and percentages of TiO2 loading at the frequency range of 15 - 25 Hz. Therefore, this study indicated that the damping property of CBC could be improved upon prolonged exposure to UV irradiation.

Keywords : biopolymer flexible foam, TGA, UV irradiation, vibration and damping
Conference Title : ICAET 2015 : International Conference on Aviation Engineering and Technology
Conference Location : Istanbul, Türkiye
Conference Dates : January 26-27, 2015

Open Science Index, Aerospace and Mechanical Engineering Vol:9, No:01, 2015 publications.waset.org/abstracts/16776/pdf