



P-5-1013

NANO AND MICRO FIBROUS COMPOSITES FOR SOUND ABSORPTION APPLICATION

Ahmad mousavi shoushtari, amir rabbi, Hossein bahrambeygi,

Textile Engeneering Department, Amirkabir University of Technology

amousavi@aut.ac.ir

In recent years, various polymeric sound absorptive materials due to their desirable viscoelastic properties have been described. However, they all show weak performance in both low and mid frequencies. Innovative solutions have been introduced by nanotechnology. Nano and micro fibrous composites are one of the best solutions to achieve high performance absorptive materials. Polymeric nanofiber layer represents a membrane that can vibrate at low frequencies, because of their large surface area, high porosity and also their light weight. In this work, the effects of applying PU nanofibers within PET nonwoven layers on sound absorption behavior have been studied. A good relationship between nanofiber layers characteristics such as mass per unit area, thickness and number of nanofiber layers and sound absorption coefficient were observed. The absorption peaks shifted to lower frequencies for samples containing nanofiber layers compering to neat PET nonwoven layer. Furthermore, the sound absorption coefficient increases with mass per unit area and number of nanofiber layers located within the PET nonwoven structure. According to the measurement of sound absorption coefficient by impedance tube, using nanofiber layers within conventional nonwoven absorbers can create excellent acoustic material comparing to traditional nonwoven absorbers. In light of successful observations, it is believed that these new absorptive composites can be used at industrial scale in various fields such as automotive and aircraft industrials, acoustic ceiling tiles, recording studio, concert hall and etc.