Study of Enhanced Sound-absorbing performance for Polyurethane Foam which Carbon Nano-tube is applied

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ABSTRACT

The semi-rigid polyurethane foam was studied to improve the sound-absorbing performance for automotive noise reduction.

The existing materials as 'Glass wool' and 'Resin felt' generally had the low fuel-efficiency due to the high product weight and environmental problems caused by the adhesive binder has occurred.

If the semi-rigid polyurethane foam was substituted for above materials, the semi-rigid polyurethane can be expected the improvements of the fuel-efficiency due to the low weight and the increased sound-absorbing performance.

Our study proceeded with the goal to enhance the conventional sound-absorbing performance of the semi-rigid polyurethane foam in high frequency range.

In this study, Carbon Nano-tube materials were added to foaming reaction by Polyol, Isocyanate and some additive to control the property, and examined for the relation between the effect of the sound-absorbing performance and the Carbon Nano-tube contents or structure.

The effects of Carbon Nano-tube were analyzed by the change of air-permeability using Flow-resistance measurement and the morphological change for the polyurethane foam using SEM measurement.

Through this study, the optimal contents and structure of Carbon Nano-tube were clarified to improve the sound-absorbing performance.

Therefore the sound-absorbing performance over the entire frequency range was significantly enhanced by increasing the viscous and frictional loss over the noise and air-permeability resulting from the morphological changes.

Keywords: Carbon Nano-tube, Polyurethane foam, Sound-absorption, Noise

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