



Study of sound-absorbing and insulating properties of regenerable materials to reduce noise

Patrycja Świrk, Lucyna Leniowska

Uniwersytet Rzeszowski
Al. Rejtana 16C, 35-959 Rzeszów
pswirk@ur.edu.pl

Many available sound-absorbing materials are made from reticulated foam, fibrous, granular, or loose materials compressed together, for example, under the influence of temperature, while maintaining a porous structure. However, most of them quickly degrade under the influence of environmental conditions, temperature, humidity, etc. In this work, an acoustic metamaterial is proposed that can be used as an absorber to obtain broadband sound absorption for acoustic silencers that reduce noise emitted during the discharge of gases or the process of air. The absorbers are installed inside the acoustic silencers, where they are exposed to the turbulent flow of a potentially contaminated or viscous fluid with suspended dust particles and carried along with the flow. The aim of the research is to develop materials that are characterised by good absorption properties and that also exhibit high resistance to moisture. Several samples of granulated materials, with regular shapes and different sizes of granules were selected for the study. It was found that high humidity does not affect the acoustic properties of the considered samples and it does not cause negative changes in the material structure. The proposed material consisting of plastic granules of different diameters is resistant to moisture and can be easily regenerated in the case of severe contamination.