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Study of polimeric household waste to determine the temperature regimes of cryogenic processing

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Utilization of human-made wastes is an important problem and finding an efficient range of solutions with respect to a variety of waste products may have a significant impact on the quality of life of societies and individuals.

The purpose of this work is elucidation of optimal regimes of cryogenic processing of used automobile tires and plastic containers from various commercial drinks in the process of their low-temperature utilization.

This work presents results of the studies of thermophysical properties of these materials. The experimental samples were obtained from various parts of the tires and constituted of 1) rubber with a capron cord, 2) rubber with a metallic cord, 3) rubber. The samples from plastic containers were obtained via oxygen-free melting in a muffle furnace.

The measurements were performed in the temperature range from 95 K up to the room temperature. The heat conductance measurements were conducted in a setup described in detail elsewhere [1].

It is well-known that polymeric and rubber materials undergo structural transformations upon cooling which affects their thermophysical properties [2]. As a result, determination of optimal cryogenic processing regimes can not be easily predicted based on simple theoretical calculations.

References

[1] A. Shinbayeva, I. Arkharov, A. Aldiyarov, A. Drobyshev, M. Zhubaniyazova, V. Kurnosov. Experimental Investigation of Thermal Conductivity of Meat During Freezing. Journal of Low Temperature Physics. Vol. 187, pp. 172-181, (2017).

[2] O. Sandberg and G. Bäckström, Thermal properties of natural rubber versus temperature and pressure Journal of Applied Physics, Vol. 50, p. 4720, (1979)

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