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Abstract Book

Anti-Icing Coating Based on a Mixture of Nanotubes and Nanofibres

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The researchers are interested in developing methods for creating anti-icing coating based on carbon nanomaterials having superhydrophobic properties. In this paper we developed a method of synthesizing the CVD method a nanostructured hydrophobic material consisting of a mixture of carbon nanotubes and nanofibers on the surface of the mineral shungite produced on an industrial scale in Kazakhstan under the brand name "Taurit". Mineral shungite under the trademark "Taurit" is a powder having an average particle size of 20 microns, contains 75% SiO₂ and 15% carbon. Preliminarily the shungite impregnated with a solution of nickel nitrate. As a precursor for the synthesis of carbon nanotubes and nanofibers was used the propane-butane mixture. By heating in an argon atmosphere to a temperature of 650 °C for 30 min was performed reduction process metallic nickel nanoparticles out nickel nitrate by reaction with particulate carbon, which is contained in shungite. The synthesis process was performed at temperatures of 700-800 °C under an argon flow rate of 80 cm³/min and propane-butane mixture of 80-100 cm³/min.

With the use of the resulting mixture of carbon nanotubes and nanofibres, using polyurethane glue as a binder, the authors designed and created a composite material having the property anti-icing. With the use of physico-chemical methods was to study the structural characteristics and properties of the anti-icing coating. Were conducted laboratory the testing process of freezing water droplets on the surface of the obtained anti-icing coating, when tilted more than 35° is absent formation an ice crust.