

CREATING OF ANTI-ICING COATINGS BASED ON NANOSCALE POWDERS OF SILICON DIOXIDE OBTAINED FROM SILICONE WASTE

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Perspective material that provide maximum anti-icing effect is coatings with superhydrophobic properties. In this paper we conducted a study on the creating of anti-icing coatings based on nanoscale powders of silicon dioxide obtained from silicone waste.

Increasing the consumption of silicone products creates environmental and economic problems in the form of accumulated waste. In connection with the foregoing problem, in this paper, study on obtaining of nanosized powder of hydrophobic silica during combustion waste of silicone is conducted. The method does not need additional external energy and the establishment of special conditions, which allows to obtain nanosized silicon dioxide from waste silicon production with low labor inputs. The results of EDAX-analysis of powder show the presence of 77% silicon dioxide and 23% carbon which is formed during the combustion of waste silicone. By using the resulting powder, nanosized silicon dioxide, ethyl acetate and polyurethane adhesive was developed the method of obtaining de-icing coating. The resulting surface has superhydrophobic properties with wetting angle of 160°.

A laboratory research is conducted on the freezing of drops of water on the surface of de-icing coatings at different angles, at ambient temperature -15 °C. Studies are conducted in the refrigerating chamber with a frequency of dripping water drops to 0.5 second, with a path length along the de-icing surface of 40 cm. Conducted researches show that when the tilt angle is over 35°, ice crust formation is completely absent, and studies have shown that created anti-icing coatings do not loses deicing and anti-adhesive properties to metal surface when it repeated cycle of heating and cooling.