

# MATERIALS AND STRUCTURES OF REUSABLE SPACECRAFT HEAT PROTECTION

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Heat protection tile structures of windward side reusable spacecraft made of different materials were analyzed. It is shown that the siliconized carbon-carbon composite materials, high temperature ceramics, heat-resistant and refractory metal alloys could be used for manufacturing of external panels of heat-protection tiles.

Notwithstanding that many variations of unique thermal protection structures were developed in the United States and Europe, heretofore a reliable thermal protection with operating temperatures up to 1100 °C which is able to withstand 100 launches with dimensions-mass and cost constraints is not currently developed. Directions of such thermal protection development were determined.

It is required to conduct development of dismountable metallic heat-protection structures for windward part of reusable spacecraft in direction of increasing structures reliability by sealing of gaps and providing required dimensions-mass parameters.

Adsorption of water by thermal insulation is also important problem.

Keywords: heat protection design, reusable spacecraft, carbon-carbon composite material, alloy.

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