# Layered composites with a self-healing effect based on an internal polymer matrix

**Zaletova I A[@], Sitnikov N N and Greshnyakova S V**

State Scientific Centre of the Russian Federation—Keldysh Research Center, Onezhskaya Street 8, Moscow 125438, Russia

[@] irina-zaletova@mail.ru

Currently, the direction of artificially created substances or systems capable of partially or completely restoring the original characteristics after the damage caused to them is undergoing rapid development. Artificial self-healing materials would open up huge opportunities, especially in cases where it is necessary to ensure the performance of materials in hard-to-reach areas for as long as possible. The ability of artificial materials to self-heal any properties can make it possible to increase their service life, reduce the cost of maintaining them in working condition and repair, and also increase the safety level of a structure or product as a whole. Based on the analyzed literature and their own experimental data, the authors propose the following definition: the effect of self-healing (self-healing) in artificial materials is a complete or partial reduction in the surface area of material damage due to directed mass transfer and consolidation of boundaries (bonds) with full or partial restoration of the functional characteristics of the material. The paper presents a composite layered self-healing material capable of restoring integrity after a through damage due to the directed mass transfer of a viscous-flowing component—borosiloxane, which has the properties of a dilatant liquid. The layered structure of the material, in which each layer performs a specific functional task, is aimed at achieving a rapid restoration of tightness during a breakdown in inflatable structures with an internal atmosphere. The work was supported by the Russian Foundation for Basic Research (grant No. 18-29-18095).