METHODICAL APPROACHES TO THE CREATION OF THE TECHNOLOGICAL PROCESS OF PRECISION DIAMOND MACHINING OF OPTICAL POLYMERS

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Now wide range of products of the optical polymeric materials (luminescent and nuclear detectors, tiles for accelerators of charged particle and calorimeters, planar and flexible lightguide, solar light converters, usual and aspherical lenses, etc) find an application for a great many science and industry sectors.

The most effective technological process of optical polymeric components surface layer forming is the precision diamond single-point machining. It is the machining which is able to ensure stable high operating characteristics of the components [1].

Now achievements of science in the field of polymer destruction mechanics allow to study cutting process of these materials from a position of micro- and macrodestruction theory and propose new methods of approach to creation of precision cutting technology.

The mechanics of polymer cutting is dominant link in definition of deformation and contact processes in cutting zone. In essence, it is a key to new technological decisions.

Creation of new technologies allows to eliminate large capacity of laborious finishing operation and ensure improvement of exploitative characteristics, including radiation and photonic stability and guaranteed longevity of ready-made optical components.

Methodical approaches to the creation of the technological process of precision mechanical machining of optical polymers will considerably vary from the others materials precision machining and non-ferrous metals for example. It brings their own peculiarities of the mechanics of cutting process, force and heat effects and formation of the quality of surface layer. Precision conditions of cutting put considerable peculiarities on the character of cutting process.

Refrences: 1. Lavrynenko S.N., and Mamalis A.G. Complex Quality Control Algorithm for Production of Ultraprecision Photonic and Bioengineering Articles from Polymers. // Proc. of 5th Int. Conf. of the European Soc. for Precision Eng. and Nanotechnology – France, 2005, Vol. 1. – P. 115–118.