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Radiation stability of silicon-organic varnish modified with nanoparticles

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Abstract

An effect of SiO₂ nanoparticles modification on spectra and integral absorption coefficient of silicon-organic varnish KO-859 before and after 30 keV electron and 100 keV proton exposure has been investigated. An increase in reflectance in UV, visible, and near-IR ranges and radiation stability of varnish modified with nanoparticles in comparison to unmodified have been established.

Key words: *Varnish, nanoparticles, concentration, modification, exposure, electrons, optical properties.*

Introduction

Polymeric varnishes and other polymeric materials are widely used in space, atomic, X-ray, and accelerator technique as electro-insulating materials, seals of various types, and as binders of various coatings. Under the influence of ionizing radiations, bonds are broken in them with radicals forming, which leads to their destruction and, in some cases, to cross-linking. One way to increase their stability to the action of ionizing radiation can be a modification by the nanoparticles. Such a method is effective for inorganic materials, for example, for metal oxides. Nanoparticles in this case act as centers of relaxation of primary radiation defects formed by the action of ionizing radiations [1 - 3]. In recent years, a large number of papers have been completed and their results regarding the modification of inorganic compounds with nanoparticles have been published [4 - 8]. The influence of the nanoparticles type, their

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