PACS: 78.67.Sc

On additivity of changes in optical properties under simultaneous and separate irradiation with electrons and protons of ZnO powder modified by SiO_2 nanoparticles

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Received 22.02.2024; revised 15.04.2024

The change of diffuse reflectance spectra of mZnO (mZnO/nSiO$_2$) micropowder modified by nSiO$_2$ nanoparticles under separate and simultaneous irradiation with 30 keV electrons and 5 keV protons has been studied. Calculations of the additivity coefficient (C_{add}), which is de-termined by the ratio of the values of the sum Δa_s a separate irradiation to its values at simul-taneous irradiation, have been carried out. It was found that C_{add} varies from 0.96 to 0.92 de-pending on the time of irradiation. Calculations for the time of stay in geostationary orbit for 7 years give the value of C_{add} = 0.87. Therefore, during ground tests of such pigment for ther-moregulating coatings of spacecraft designed for long flight times it is necessary to carry out joint action of these types of radiation or take into account the values of C_{add}.

Keywords: zinc oxide, silicon dioxide, modification, irradiation, electrons, protons, reflection spectra.

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