




МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
СУМСЬКИЙ ДЕРЖАВНИЙ УНІВЕРСИТЕТ

ФІЗИКА, ЕЛЕКТРОНІКА, ЕЛЕКТРОТЕХНІКА

ФЕЕ - 2019

МАТЕРІАЛИ
та програма

НАУКОВО-ТЕХНІЧНОЇ
КОНФЕРЕНЦІЇ

(Суми, 23-26 квітня 2019 року)

Суми,
Сумський державний університет
2019

The impact of laser radiation on nanoparticles, which using in medical

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Today, one of the most important areas of medicine is the fight against cancer tumors. There are methods of treatment with radiation devices, in this case, a large part of the surface of the affected organs and organs bordering the affected one is irradiated, thus, cells not affected by the disease die. Also, another method of treatment is chemotherapy, such treatment adversely affects the entire body.

This paper proposes a method of modified chemotherapy, which consists in the use of nanoparticles of porous silicon. These pores are filled with medicine for chemotherapy. Using the property of malignant tumors to accumulate inside themselves any inclusions, the nanoparticle with the drug is localized exactly in the area where it is necessary to neutralize the actions of cancer cells. To prevent the loss of a beneficial drug during transport, the nanoparticles are coated with a heat-sensitive polymer. In order to speed up the process of action of the drug container, thereby concentrating most of it on the tumor, the nanoparticles are irradiated with infrared radiation. In consequence of this, the destruction of porous silicon, which is very sensitive to laser radiation, occurs, and the drug is localized on the malignant tumor.

Therefore, the study investigated the effect of laser radiation on silicon nanoparticles, namely the parameters of a femtosecond fiber laser were investigated: radiation energy density, pulse duration, light pressure. All these parameters lead to the combustion of silicon directly on the tumor or crushing the nanoparticles. At the same time, in a short impulse time, only a local temperature increase occurs, which will not cause negative consequences for surrounding tissues. And the remains of porous silicon are processed by the body to silicic acid, which is useful for cells. It is also known that excess silicon in the body is processed into silicic acid for 13 days.

It is suggested to check the effect and presence of nanoparticles at the site of tumor localization using Raman spectroscopy. This method allows using laser radiation to determine the composition of living cells.