ENERGY DEPTH DISTRIBUTION OF PULSED ELECTRON BEAM OF WIDE ELECTRON KINETIC ENERGY SPECTRUM FOR AN ALUMINUM TARGET*

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An electron beam is a high-tech tool which can be used in various fields of radiation technology [1, 2]. Utilizing of pulsed electron accelerators with a wide range of electron kinetic energies significantly reduces the cost of their production. Besides, the electron beam ejected to the atmosphere can significantly expand its application scope. Transmission of the electron beam to the atmosphere trough sealing membranes substantially changes its initial spectrum. Therefore, knowledge of pulsed electron beam characteristics is necessary for use it for scientific and practice applications.

Current work analyze the pulsed electron beam extracted from the vacuum diode through a titanium foil (60 microns) of the diode exit window. Electron beam energy depth distribution was measured for a target made of different number of aluminum foils. A pulsed electron beam with a wide range of kinetic energies was generated by the ASTRA-M accelerator (260 kV of accelerating voltage, up to 1kA of beam current, 150 ns of beam pulse duration at FWHM)[3]. Total absorption calorimeter was used to measure beam characteristics. Calorimeter included two collectors: first for measuring of a beam energy after aluminum foils, and a second one for measuring total beam energy. All measurements were performed at 10^{-5} Torr background pressure after the exit window foil. As a result, the electron kinetic energy spectrum of the beam out of diode has been reconstructed. The calculation of electron energy spectrum after titanium foil was made with help of database[4].

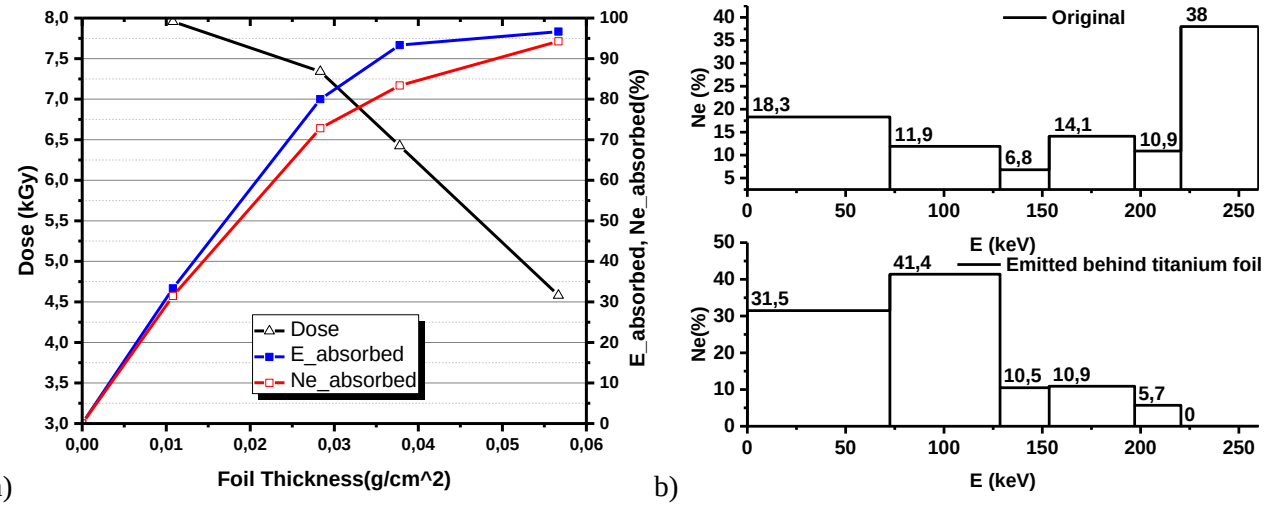

Fig. 1. a) Absorbed Dose, beam energy and electron numbers distribution from depth aluminum target, b) Electron beam energy spectrum before and after titanium foil.

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