Republic of Iraq Ministry of Higher Education and Scientific Research AL- Muthanna University College of Science Department of Physics



Determination of Alpha Particles Effects

on CN-85 NTD Detector Profiles

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Abstract

Solid-state nuclear track detectors (SSNTDs) are reliable detectors for the most popular radiation detection due to their high sensitivity to charged particles. In this Research, the CN-85 nuclear detector is utilizing to detect the nuclear tracks of the Alpha particles .Where it is founded in this study . The Bulk Etch Rate (V_B) CN-85 of the detector, where is the irradiation of CN-85 detector with thickness of (100 µm) different energies (4.5748, 4.0832, 3.5589 , 2.9912 , 2.3611 , 1.6273 and 0.6387) MeV that emitted from the source of ²⁴¹Am , and the alpha particles radiation time as (5min) and incident angles from (90° ,80°,60° ,and 40 °) . The detector is Etched with NaoH sodium hydroxide etches solution with normality of (2.5M) at an etches temperature inside the water bath of (60 ± 1) C° different etching times rang (0.25-4) hr . A series of experiment measurement of the major axes (D_1) and minor axes (D_2) are then carried out, calculating V_T (Track Etch Rate) vertical and oblique incident computer processed image technology was used to collect images of effect collected directly from microscope equipped with digital camera connected. Calculating the diameters of the tracks from surface of the detector of etching operations. The diameter of the major impact is as large as possible when vertical incident is almost equal to the miner diameter then it starts to increase with the decrease of the angle of incident from (90°) to (40°) and reaches its upper value when the vertical incident and then begins to decrease at very low rate with a decrease in the angle of incident. It was also found the major and minor effects increase with the increase of the energy of the incident particles and reaches the maximum value at energy it was founded the

diameter of tracks major and minor increase linearly with the line of etching by the rest of the variables.