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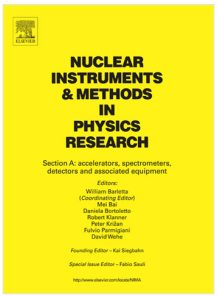

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Empirical Model of Alpha Particle Track Length in CR-39 Detector

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Abstract

In this work, a new empirical equation is used to describe the track length evolution against the etching time, alpha particle energy and track longitudinal length respectively. In this equation, six fitting parameters are employed in order to achieve reasonable fitting. The tracks length formed on the CR-39 by alpha particles, at different energies and etching times, can be reproduced using this empirical equation. The fitting parameters extracted from the experimental data can be used to predict etched track lengths at different energies and etching times which are capable of reproducing all the features of track length evolution as a function of etching time and particle energy.

Keywords: Empirical model, Track etch rate, Alpha particle energy, CR-39 detector.

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1. Introduction

It is well known fact that the important solid state nuclear track detectors (SSNTDs) are important tools in radiology [1-3]. One such detector the CR-39 in particular has been extensively used in studies related to radiation levels monitoring [4-6]. CR-39 is well suited for environmental radiation levels measurements in air, water, soil, building materials, agricultural products, etc [7-9].