Tab. 2. Calibration factors

| Radiation source | | Effective energy [keV] | Calibration factor [1/kg] |
|---|---|---|---|
| X-ray Tube voltage [kV] | Filtration | | |
| 60 | 4 mmAl + 0.6 mmCu | 46 | 1.812 |
| 150 | 4 mmSn + 2.5 mmSn | 114 | 1.709 |
| 250 | 4 mmAl + 2.5 mmSn + 3 mmPb | 195 | 1.737 |
| $^{137}$Cs | | 662 | 1.744 |
| $^{60}$Co | | 1250 | 1.794 |

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# Alpha Spectrometry by Using CN85 Plastic Track Detectors

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*In the present study the alpha particle response which is characteristic of cellulose nitrate detectors CN85 was investigated The track diameter as a function of alpha energy was examined. With regard to the spectroscopy of alpha from track radii it was stated that the discrimination of lower alpha energies shows better results than the high energies for the present etching condition.*

*In der vorliegenden Studie wurde die Reaktion der Alpha-Teilchen, wie sie für Zellulosenitrat-Detektoren vom Typ CN85 charakteristisch ist, untersucht. Es wurden Aussagen über den Spurendurchmesser als eine Funktion der Alpha-Energie getroffen. Im Hinblick auf die Alpha-Spektroskopie von Spurenradien wurde festgestellt, daß in der genauen Unterscheidung die niedrigeren Alpha-Energien bessere Ergebnisse aufweisen als die hohen Energien unter den vorliegenden Ätzbedingungen.*

## Keywords

alpha sources; alpha spectroscopy; americium 241; cellulose esters; dielectric track detectors

## 1. Introduction

In recent years Solid State Nuclear Track Detectors (SSNTD) have been used increasingly in different fields. Some of the advantages of Solid State Nuclear Track Detectors are the following: they are small in size, flexible in geometry and can be used for discriminating against high background of less ionizing radiations and, besides, they are integrating detectors.

As reported by *Hussain* et al. [1 – 3] Solid State Nuclear Track Detectors have been used for neutron application. There exist only very few reports on the detection of light charge particles [4 – 8], especially on the new product named CN85 [9].

With regard to alpha particles we discuss in the present paper the experiments which were carried out by us in order to study the response of the CN85 cellulose nitrate film to energy discrimination.

## 2. Experimental results and discussion

The Solid State Nuclear Track Detectors used in the present work was a cellulose nitrate CN85 (manufactured by Kodak, Pathe-France). These detectors were studied with regard to their light charged particle registration characteristics. The detectors were irradiated with monoenergetic alpha particles from a $^{241}$Am alpha source. The exposures to the alpha particles were carried out in a Canberra cylindrical chamber (model 7400) with an internal diameter of 13.5 cm.

Alpha particles of different energies were obtained by changing the source to the detector distance in the chamber under atmospheric pressure. The energies of alpha particles were estimated in using the results of the work by *Rotondi* and *Geiger* [10]. After the exposures, the detectors were etched in a 2.5 N solution of NaOH with a maintenance for 28 min at 60 °C.