

THE EFFICIENCY OF ALPHA-PARTICLE REGISTRATION IN CELLULOSE NITRATES

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The relative sensitivity and the threshold of sensitivity to α -particles of several kinds of cellulose nitrate (Milan Blagojević) were determined. The NC specimens differed from one another in physico-chemical characteristics ($\%N=11.9-12.1$; $\eta=0.8-50$). Thin NC layers of a thickness of about 50 μm were exposed to alpha particles of $E=2-5$ MeV and then etched in a 10% NaOH solution at 40°C for a time needed to dissolve a non-exposed layer of a thickness of 2 μm . The relative registration efficiency, the threshold of sensitivity, the pit diameter of α -particles of an energy of 3 MeV (\bar{d}) and other measured characteristics are given in Table I. The characteristic

Table I

Commercial name	$\eta(c_p)$	$\% N$	r_B (m/h)	d (μm)	efficiency reg. (%)	threshold (MeV)
1 NC-75	0.8	11.97	1.0	3.5	~ 75	3.6 ± 0.1
2 NC-650	5.0	12.25	0.5	1.8	~ 80	3.5 ± 0.1
3 NC-1800	18.4	12.35	0.3	0.5	~ 45	3.5 ± 0.1

sensitivity threshold, defined as an abrupt change in efficiency as a function of energy, is presented in Fig. 1, while the densitometric characteristics of three typical NC specimens obtained by exposing them to α -particles from Am^{241} (the distance between the source and detector being 2 cm) are shown in Fig.2.

A highest registration efficiency is exhibited by a NC specimen of medium viscosity and nitration percentage. The track pit diameter of an alpha particle of a given energy decreases with increasing η and $\%N_2$, whereas the threshold shows a characteristic value for all the specimens ($E_0 \approx 3.5$ MeV). The densitometric characteristics are associated with the pit diameter of the recorded tracks.

