TABLE I. Values of log D_F Found for Thorium Nitrate After Decontamination by Applications of Attapulgus Clay Aqueous Suspensions.

Materials	Number of Applications 1	2	3	4
Mild steel	0.62	0.77	0.80	0.80
Stainless steel	2.22	2.51	2.53	2.53
Lead	1.38	1.73	1.80	1.80
Aluminium alloy	1.80	1.95	1.97	1.98
Polytetrafluoroethylene	1.57	2.22	2.24	2.25
Polyviylchloride	2.00	2.82	2.82	2.83
Polypropylene	1.70	2.39	2.41	2.41
Polymethylmetacrylate	2.12	2.89	2.90	2.90

TABLE II. Values of log D_F Found for Uranyl Nitrate after Decontamination by Application of Attapulgus Clay Aqueous Suspensions.

Materials	Number of Applications 1	2	3	4
Mild steel	0.58	0.72	0.75	0.76
Stainless steel	1.63	1.75	1.76	1.78
Lead	1.01	1.26	1.31	1.32
Aluminium alloy	1.33	1.66	1.72	1.73
Polytetrafluoroethylene	1.41	1.54	1.63	1.64
Polyvinylchloride	2.20	2.41	2.43	2.43
Polypropylene	1.98	2.30	2.32	2.32
Polymethylmetacrylate	2.32	2.49	2.50	2.50

is about 78% for Uranium and 80% for Thorium respectively.

– Decontaminated surfaces do not show visible damages except for the mild steel.

– Total removed activity increases with the number of applications, to reach a level at which no further improvement is obtainable.

– For investigated materials, whose log D_F are lower than 1.40 after first attapulgus clay application, it is possible to foresee decontamination factors obtainable in the successive treatment by the following relation which we suggest:

$$\log(D_F)_n = 1.31 \log(D_F)_1 \text{ thn}$$

where $(D_F)_n$ = decontamination factor obtained after the first application; $(D_F)_1$ = decontamination factor obtained after the nth application; n = number of applications.

– For all the investigated materials, except the mild steel, the residual activity found after four applications is below 1.85 Bq cm^{-2}.

The decontaminating method, in our experimental conditions and with the above mentioned exception, allows to reuse uranium and thorium nitrate contaminated materials.

E38

Uranium Optogalvanic Laser Spectroscopy

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When laser radiation is sent into a hollow cathode lamp and the radiation wavelength is tuned on an absorption line of a species which is present in the lamp, the discharge impedance does change. This optogalvanic effect can be used to obtain spectroscopic information about the cathode elements and/or the buffer gas.

This technique is particularly powerful for refractory elements since it associates the efficiency of sputtering evaporation to a straightforward and very sensitive detection means.

We use this technique in order to study the uranium spectrum, detect new atomic energy levels and measure physical parameters useful for a laser isotope separation process.

E39

Spallation-produced Radiolanthanides via Tantalum; Coprecipitation with Fluorides and Separation in Short Columns with Cation-exchange Resin

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Nuclear reactions of tantalum spallation by high energy protons is an effective way to get neutron deficient radiolanthanides of the yttrium subgroup of rare-earth elements. Lanthanides were separated from tantalum dissolved in $HF-HNO_3$ by coprecipitation with LaF_3 adsorbed in cation-exchange resin. This excluded completely their loss at the stage of preparation for chromatographic separation.

The combined sample of lanthanides was separated to individual elements in the short columns 70 × 3 mm Aminex A-5 13 ± 2 m by the buffer solution of alpha-hydroxyisobutyric acid with pH = 4.5. The target treatment and chromatographic separation lasted for about an hour. The chemical yield of elements was about 90%, contamination with neighbouring lanthanides being not more than 1%. The technique was developed with a glance to using it behind the biological shield with the help of remote-control devices. It has been successfully employed to get relatively short-lived ($T_{1/2} \simeq 10$ min) nuclides for nuclear spectroscopic investigations and to prepare samples of ^{167}Tm($T_{1/2}$ = 9.25 days) for the purposes of nuclear medicine.