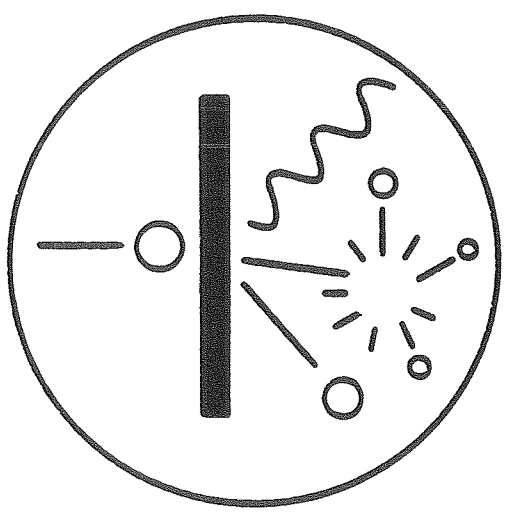
INTERNATIONAL NUCLEAR

TARGET DEVELOPMENT SOCIETY

NEWSLETTER



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Editors Note

Dear Colleagues,
Our previous editor, Jan Van Audenhove, has retired after a long and distinguished career in which he established and guided target preparation work at CBNM. His contribution to our institute and to INTDS will not be forgotton and his past colleagues wish him well in his retirement. I know he will not be idle !

I have stepped into the Editor's shoes (not literally) and, with the priceless assistance of Edith De Coninck and your support, the Newsletter will continue to appear twice a year. Don't forget that the Newsletter can be useful to you in many ways : Do you need information ? Do you need a weird target ? Do you want to give all your equipment away ? Do you want a job ?

Chris Ingelbrecht
EDITOR

APPRECIATION EXPRESSED TO JAN VAN AUDENHOVE

FOR NEWSLETTER PUBLICATION

On behalf of all INTDS members, I want to express my sincere appreciation to Jan for his untiring efforts in disseminating information about what is going on in our Society through the publication of the INTDS Newsletter. The Newsletter together with the publications from our biennial conferences provides information about many areas of material science, including target and special nuclear materials research, development, and production efforts. The Newsletter provides the INTDS membership an informal method of information exchange that is very beneficial.

Jan has made many significant contributions to the Society and to the scientific community. His many technical publications from INTDS conferences and other technical meetings are recognized as very important contributions in the areas of target and/or special nuclear materials preparation. His contributions, as an INTDS member and especially during his tenure as President of our Society from 1983 to 1986, have made our Society much stronger. Thus, as most of us know, Jan's assuming responsibility for the Newsletter publication in 1980 as well as the fulfillment of this responsibility in an outstanding manner is only one of the many ways Jan has made contributions that have strengthened our Society.

We would also like to extend to Jan our congratulations and best wishes on his retirement from CBNM.

Again, thanks Jan for your many efforts that have made the life of a target maker a little easier.

Harold L. Adair
President, INTDS

REMINDER

The Fifteenth World Conference of the International Nuclear Target Development Society will be held in Santa Fe, New Mexico, on September 10 - 14, 1990.
Pre-registrations for the meeting, to be held at the Santa Fe Hilton, have been encouraring, with about 50 papers scheduled thus far. All INTDS Members would have received announcements and meeting information months ago, but any persons desiring further information about the meeting should contact

Dr. Peter GOBBY
Los Alamos National Laboratory
MS-E549
USA - Los Alamos, New Mexico, 87545
Phone : 505 - 667-6009
Fax : 505 - 665-2104

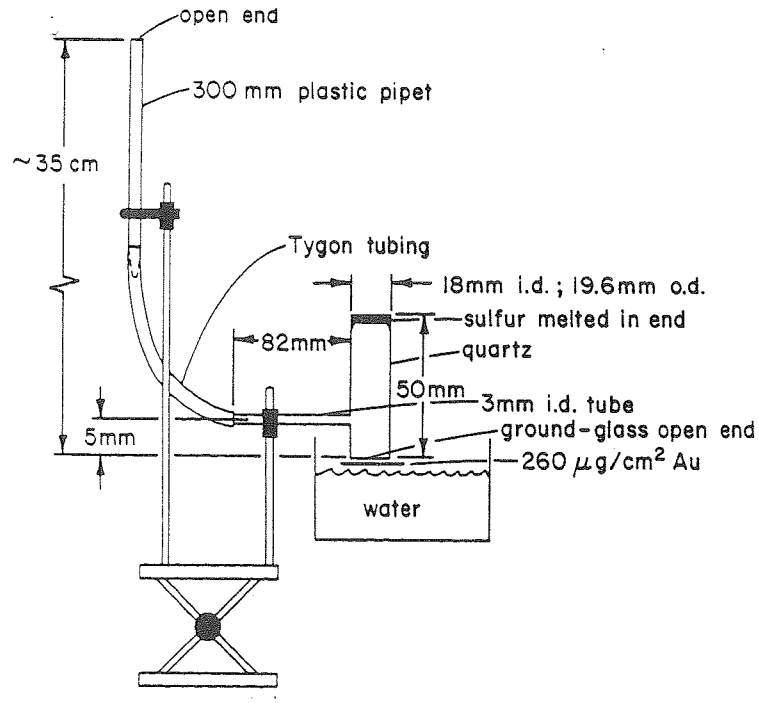
PREPARATION OF GOLD-COVERED SULFUR TARGETS*

W. Lozowski and J. Hudson
The Indiana University Cyclotron Facility
Bloomington, IN 47408

We used a simple method to prepare 2.5-4.1 mg/cm^2 targets of ^{32}S by sublimation/condensation onto 260 microgram/cm^2 Au foils. To prepare the 2.5 mg/cm^2 target, 9.1 mg of ^{32}S was quickly melted (gas/air torch) in the bottom of a quartz bottle (shown inverted in the drawing). The side tube on the bottle was used to blanket the sulfur with argon during the melting and during the sublimation.

After the melting, the bottle was inverted and suspended as shown approximately 1.5 mm over a preweighed Au foil (floating on deionized water). A slow flow of argon from the bottle was used to dry the top surface of the Au before lip of the bottle was lowered into contact with the Au. The flow of argon was maintained until the lip of the bottle contacted the Au. When contact was established, the argon supply was disconnected at the top of the plastic pipet. The pipet top was left open to the room. By carefully heating the bottle with a torch and observing the sulfur cloud which formed within, it was possible to achieve condensed layers of sulfur which were uniform to the 10% level. The sulfur-coated Au was separated from the lip of the bottle by raising the bottle slightly before applying a small puff of air in the top of the pipet. The film was then lifted from the water onto a target frame (2 cm dia hole), allowed to dry, and secured to the frame with five-minute epoxy.

An overlying Au layer of 260 microgram/cm^2 was added to enable the sulfur targets to be used in high vacuum and in the IUCF beam. To accomplish this, a gold foil was floated in water, the mounted film was vertically immersed in the water, and both were withdrawn in the usual manner. A target made in this way withstood a beam current on the order of 100 nA of 200 Mev p$^+$ for 2 hours. While the presence of oxygen and carbon were noted in the spectra, their peaks were well separated from the excited states of ^{32}S.



Apparatus: ^{32}S on Au

*Work suported in part by the National Science Foundation
NSF PHY 87-14406

IUCF TARGET LAB ACTIVITY REPORT
May 1989- April 1990

W. Lozowski and J. Hudson

Target preparations included: $^{6,7}Li$, $^{10,11}B$, BeO, $H_3{}^{10}BO_3$, $^{10}B_2O_3$, CH, CH_2, CD_2, $^{12,13}C$, Mg, Al, ^{30}Si, $^{30}SiO_2$, ^{31}P, ^{32}S, $^{40}CaI_2$, ^{48}Ca, ^{50}Ti, ^{51}V, ^{59}Co, $^{71}Ga_2O_3$, Pd, ^{87}RbF, Ag, $^{117,120}Sn$, ^{205}Tl, $^{206,208}Pb$, Au, U acetate, and UO_2.

Beginning in April of 1989, target lab equipment and materials were used to investigate the occurrence of signature products expected from cold fusion. The number of IUCF people involved followed the exponential decay curve widely observed as representative of the interest in cold fusion worldwide. However, the most tenacious of the in-house researchers hung on to do experiments with progressively lower background levels, consistently producing null results. During this time, many foils of Pd, Ti, and V were rolled then annealed and pre-loaded with D in a high-vacuum furnace. Measurements obtained with an ultra-microbalance revealed the saturation levels achieved to be equivalent to the theoretical limits reported in the literature. Several electrocell configurations were tried using variations of the basic theme: palladium cathode and platinum anode in lithium-doped deuterium water. Given the resources at hand, the opportunity to investigate the claims was exciting and irresistible.

Growing crystals of yttrium ethyl sulfate was an ongoing project.The preparation of an additional batch of saturated Y.E.S. solution required 2.5 months. Crystals were grown concurrently by two methods:
a) maintaining the Y.E.S. solution jar at zero °C in a well-insulated box while removing water with a vacuum pump
b) maintaining a highly uniform temperature throughout a controlled temperature bath and lowering the temperature of the solution 0.1 °C per 14 hr.

The former (pumping) method was more fully instrumented with vacuum gauges. This allowed steady state growing conditions to be obtained much quicker after the crystals were returned to the solution following examinations outside the jar. The addition of a precision needle valve and a 25W heater for it also produced more stable growing conditions.

The latter (lowering the temperature) method was begun in July. Initial problems were traced to a 0.15 °C vertical gradient over the 10 cm depth of the solution. It was prevented by anchoring the solution jar, buoy-like, deep in the bath water and redesigning the outermost jar cover to be a free-floating five-sided box of Thermax insulation. Of the two growing methods, the best (clear and crack-free) growth on crystals suspended in Y.E.S. solution has occurred in the controlled temperature bath.

A sample of cloudy Y.E.S. crystal was cut successfully with a wire saw for a polarization measurement. All attempts to cut this material with a wet-string saw were unsuccessful because the crystal contained cracks and small solution inclusions. The new saw, built in house, utilized a 200 micrometer thick wire impregnated with 45 micrometer diamonds (Laser Technology Inc.). The cutting was done with a dry wire and was accomplished with very little waste of crystal material.

Enriched $^{40}CaI^2$ targets of 30 mg/cm^2 x 1.27 cm dia were prepared from material obtained by direct reaction of the elements. Successful synthesis was obtained in a quartz tube 25 cm long x 12 mm o.d. with one end fused closed and the other sealed with a neoprene stopper. The stopper was penetrated with a small tube to allow pressure monitoring and pump out. The tube was loaded (within the argon atmosphere of the glovebox) with 40 mg of ^{40}Ca metal filings and 259 mg of iodine crystals before it was evacuated to 30 micron. A gas torch was used to heat the tube selectively, limiting the speed of the reaction to ensure that an absolute pressure of 1.68 Bar was not exceeded. The maximum temperature used was less than 600 °C. Weighing the compound in the glove box indicated that the correct stoichiometry had been achieved; moreover, the pressed-powder targets made from it were used successfully in (p,n).

Rubidium fluoride (^{87}RbF) targets of 30 mg/cm^2 x 1.27 cm dia were made from $^{87}RbCl$ (obtained from ORNL) with the aid of a strongly basic anion (RzOH) type ion-exchange resin. Our attempts to achieve a high exchange efficiency by first converting the resin to an RzF form (with 1N HF) were not successful. The fallback method which gave an overall efficiency of 80% for the conversion from RbCl to RbF was to pass a 0.1N solution of $^{87}RbCl$ through a prepared-bed resin column (with 2x the required amount of resin) to form RbOH + H_2O first. This product was dried completely (in Teflon) by the use of 2,2-dimethoxypropane and gentle heating before 48% HF was added to form ^{87}RbF + H_2O + excess HF. After drying, a test for chlorine ions, sensitive to the 0.03% level, was conducted and no chlorine was detected.

Grinding the powder, distributing it in the 1.27 cm dia die, and pressing were done in the glove box. Gold foils of 260 microgram/cm^2 were pressed onto both sides of the pellet to afford additional mechanical strength and protection from moisture. Good (p,n) data was obtained from the targets.

Deuterated polyethylene films of 35-50 cm^2 area were prepared in thicknesses of 0.3-2.0 mg/cm^2 and 500 mg/cm^2. Gold-flashed CD_2 films in the thin range (above) were required for beam polarization measurements. With practice, 5 cm x 10 cm areas of these thin films were pour cast and polymerized on glass plates by using hot solutions of CD_2 in xylene. Uniformities within 23% over the entire areas were commonly achieved. The vacuum-evaporated gold layers (25 microgram/cm^2) applied to each side of the foils increased their useful life from hours (uncoated) to days.

The 500 mg/cm^2 CD_2 target, required for p(n,p), was 5 cm x 7 cm. Because the experimemt was extremely sensitive to hydrogen contamination, the CD2 powder (acidic as purchased) was ground and washed before it was pressed. Grinding the coarse-grained,gummy powder was accomplished by prefreezing it with LN_2 within a porcelain mortar. A tall collar on the mortar and a long-stemmed pestle were necessary to keep the powder from escaping. The grinding and washing resulted in a pH near normal and a 2.8% wt loss of the CD_2. Also, the powder became fine grained; therefore, it was easily distributed in a die made for the pressing. The die body was made from four bars of 304 stainless steel, bolted together. The die pistons were made of aluminum.

Cold pressing was used to allow easier recovery of the CD_2 after the experiment. Pressing was done at 389,518, and 648 kg/cm^2; afterwhich, the die was rotated 180° and the sequence repeated. By direct measurement with a micrometer, the target had only 1% nonuniformity (+-5mg/cm^2). It was also found to contain no more hydrogen than expected from the 98 atom % D_2 starting material.

The aluminum-flashed mylar cover foils on the 77.5 mg/cm^2 ^{14}C target were replaced with foils of gold-flashed styrene. It is hoped that the higher resistance of styrene to severe radiation damage will enable longer periods of time between changes of the cover foils; the onset of severe damage was reported to occur at a gamma dose 40X greater in styrene than in Mylar (Effects of Radiation on Materials and Components, M.H. Van de Voorde, CERN 70-5, 1970). The new foils are each 1.2 mg/cm^2 with 60 microgram/cm^2 of evaporated Au for better heat dissipation. Because styrene contains no oxygen and the foils are 30% thinner than the 1.7 mg/cm^2 mylar ones, the data taken with ^{14}C in E326 contained much less background than in earlier runs.

An IBM PC with an Ortec MCA card (ACE2-B1) was added to the target lab. This equipment will allow alpha-gauge thickness measurements of thin targets on a routine basis. In March, we used a temporary setup in the vacuum evaporator to check the stated thickness of several $Si^{16}O_2$ and $Si^{17}O_2$ pressed-powder targets. Work was also begun on resurrecting a stainless-steel vacuum chamber, fitted with an Orbital Ion Pump, to house a dedicated, oil-free setup.

ARGONNE NATIONAL LABORATORY
9700 South Cass Avenue, Argonne, Illinois 60439

Tel. 708/972-5364
Fax. 708/972-3903

April 24, 1990

Mr. J. Van Audenhove
Editor, INTDS Newsletter
CBNM
Steenweg Op Retie
B-2440 Geel
Belgium

Dear Jan,

Here are some recent highlights from our lab.

Argonne National Laboratory - Recent Activities

John P. Greene & George E. Thomas

1. A vertical electron beam gun (mortar source) has been reinstalled in the NRC 3117 evaporator. It is currently being employed for high temperature reductions of the rare-earth oxides including Er, Gd and Nd. Targets of ^{148}Nd on stretched gold backings were prepared using this source.

2. A set-up was recently built in the target lab for using the energy loss of alpha particles for ascertaining foil thickness. Used in conjunction with an MCA, energy loss measurements have been made using a ^{249}Cf source. An ADC board and software were purchased from NUCLEUS Inc. for our IBM PC, which is now used to acquire and analyze the target thickness measurements. Look-up energy loss tables are viewed on the Physics Div. VAX computer.

3. Because of a need for low-level radioactive targets, a laboratory was assembled dedicated to the production of these foils. Targets of ThF_4 have been prepared in this lab for a recent experiment at ATLAS. We anticipate a need for UF_4 targets as well and will evaporate these in the near future. A second, much smaller evaporator was constructed for close proximity evaporations of higher activity materials. The size of this system (8" bell jar) allows for a minimum of contamination and can be placed within a hood.

Sincerely,

John P. Greene

George E. Thomas

George E. Thomas
Physics Division

JPG:GET:cw

Activity Report

Nuclear Physics Laboratory
S.U.N.Y. at Stony Brook
Stony Brook, NY 11794-3800

Andrzej R. Lipski

Targets listed in the table below have been prepared in the target laboratory during the last ten months. Over 100 targets have been produced by various techniques.

Isotope	Chemical form final	Chemical form initial	Backing	Target thickness $\mu g/cm^2$	Method
^{208}Pb	^{208}Pb	^{208}Pb,^{208}PbO	ss,C	200-1000	a,d
^{144}Sm	^{144}Sm	$^{144}Sm_2O_3$	ss,Fe,Gd,Pb	800-2000	c
^{116}Cd	^{116}Cd	^{116}CdO	C	300-700	d
^{93}Nb	^{93}Nb	^{93}Nb	ss	1000-3000	b
$^{92,98,100}Mo$	$^{92,98,100}Mo$	$^{92,98,100}Mo$	C	40-130	a
$^{194,195,196}Pt$	$^{194,195,196}Pt$	$^{194,195,196}Pt$	ss	700-1000	b
$^{198,nat}Pt$	$^{198,nat}Pt$	$^{198,nat}Pt$	ss	700-1000	b
^{7}Li	^{7}Li	^{7}Li	ss	1500-2000	b
^{103}Rh	^{103}Rh	^{103}Rh	C	220-400	a
^{165}Ho	^{165}Ho	^{165}Ho	C	170	a
^{141}Pr	^{141}Pr	^{141}Pr	ss,C	120-1500	a,b
^{128}Te	^{128}Te	^{128}Te	Pb	900	a
$^{112,117,119}Sn$	$^{112,117,119}Sn$	$^{112,117,119}Sn$	ss	160-1300	a
$^{120,nat}Sn$	$^{120,nat}Sn$	$^{120,nat}Sn$,SnO_2	ss,C,Pb	160-1700	a,b
^{nat}Ta	Ta	Ta	ss	500-2000	b
^{nat}Al	Al	Al	ss	100-2000	a,b
^{nat}Zn	Zn	Zn	ss	2000	b
^{nat}Sc	Sc	Sc	ss	2000	b
^{nat}Au	Au	Au	ss	100-400	a
nat	CaF_2	CaF_2	C	400-500	a
nat	PbO	PbO	C	200-300	a
nat	Al_2O_3	Al_2O_3	Al	300-1200	a

a- vacuum evaporation (resistive or "e" gun),
b- rolling between stainless steel plates,
c- reduction of the oxide and simultaneous vacuum evaporation of the resulting metal; condensed matal collected and rolled between stainles steel plates,
d- reduction of the oxide to the metal by heating in contact with ZrO_2 (powder) and simultaneous vacuum evaporation of the resulting metal,
nat- element in natural form/not separated isotopes,
ss- self supported target

ELECTROSPRAYING OF ION-EXCHANGE RESIN PADS FOR RADIOACTIVE SOURCE PREPARATION

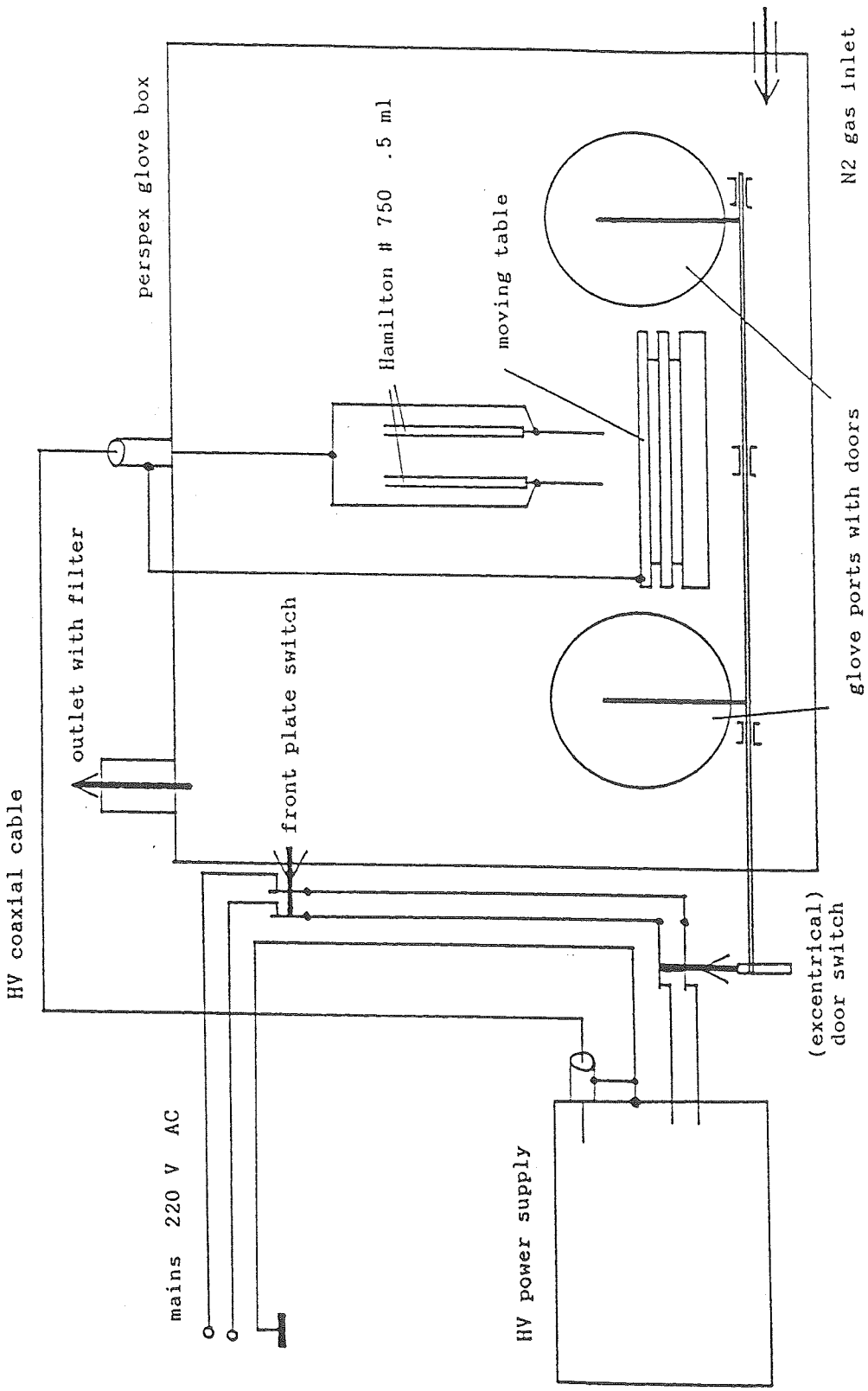
Alok Srivastava, G. Grosse, and B. Denecke

CEC-JRC, Central Bureau for Nuclear Measurements, B-2440 Geel

An electrospraying assembly has been set up with the objective to produce resin pads for quantitative preparation of radioactive sources. The principle of the method, developed by Lowenthal and Wyllie (1973), is to electrospray ion exchange resins of mesh sizes in the range of 38 to 74 µm onto metallized VYNS foils. These resin pads can be used to confine the quantitatively wheighed drop of the radioactive solution for preparing quantitative radiation sources.

A schematic diagram of the electrospraying unit is shown in the figure. It consists of two spraying heads made from glass syringes fitted with silicon treated Hamilton stainless-steel needles. The substrate can be moved in X and Y direction to form more homogeneous layers. The spraying needles are connected to a high voltage unit which can deliver up to 6 kV. Spraying is carried out in a glove box which can be continously purged with dry nitrogen gas to preserve a dry and dust-free atmosphere.

G. C. Lowenthal and H. A. Wyllie, Int. J. Appl. Radiat. Isot. 24 (1973) 415.



Schematic Diagram of the Electrospraying Unit

Activities at NSC Target Laboratory

D.K.Avasthi,Jaipal and S.Gargari

Nuclear Science Centre,JNU Campus,

New Delhi-110067,India

Target development laboratory is being set up as a research support facility to 16 UD Pelletron accelerator. Two methods i.e. resistive heating and cracking of hydrocarbons by D.C. glow discharge have been attempted to make stripper foils. For this purpose,an evaporator with a glow discharge unit is assembled. It has two chromium coated copper plates of 142 mm diameter as electrodes. The high voltage connections inside the vacuum and the electrodes surfaces except the space between which the discharge strikes is covered with teflon to avoid spreading of discharge. The spacing between the electrodes is kept about 60 mm. A metal mask with 28 holes of 15mm diameter is placed on a finely polished s.s. plates. A high voltage power supply with the rating of 5KV ,500ma is fabricated for the use in glow discharge.Benzene vapours were used for discharge. The carbon foils of thickness about 5ug/cm^2 have been made using benzene vapors. Ethylene cracking is now being attempted.Benzene effects the pump oil and gasket.

A simple system based on the attenuation of optical light is made for thickness measurement of carbon foils. A vacuum chamber with a rotatable multiple foil holder and source holder is fabricated to measure the thickness of foils by alpha energy loss method. With this set up, the thickness of four foils can be measured without breaking the vacuum inside the chamber.The

reproducibility in making stripper foils and thickness uniformity of the foils made by DC glow discharge technique seems to be better. The uniformity of the foils made in a hydrocarbon cracking batch is found to be within 3.5% as measured by the optical thickness gauge.

There is a plan to make stripper foils by electron bombardment and DC sputtering also.The mechanical strength of the stripper foils made by different techniques will be tested so as to choose the method for making the stripper foils for use in the accelerator.Two methods are planned to test the strength of foils.In one method , the air is made to gush in close to the foil kept in vacuum.The air flow is controlled and recorded with a VAT variable leak valve.The other method to test the strength of the foil consist of a smooth polished surface kept at high voltage up to 6-7 KV and the foil holder with the foil is made to move towards the polished surface by screw gauge to record the distance at which the foil breaks.Finally, the foils will be put to the test with the ion beam when it is made available from Pelletron.Slackening of the foils is also planned by keeping the foils under differential pressure.

Another evaporator with a diffusion pump of speed 1000 l/s and liquid nitrogen trap is set up to install the electron gun.The arrangements have been made to mount the saddle field ion source and it has been tested to give Ar ion current of 200 μa .A heavy ion sputtering unit will be set up using the saddle field ion sourse to make the target foils of expensive materials and enriched isotopes.

NUKEM

TELEFAX

06181-58 ~~2727~~ 2283

Zahl der Seiten (incl. dieser Seite): 1
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An / to	Absender / Sender
Commisson of the European Communities att. Mr. C. Ingelbrecht Central Bureau for Nuclear Measurements Steenweg op Retie 2440 Geel / Belgium Fax No.0032-14-584273	c/o **Name:** E. Wehner **Abt. / Dept.:** PSN **Tel.:** 58-2143 **Datum / Date:** 26.06.90 **Unsere Abt.-Fax-Nr.:** **Our Dept.-Fax-No.:** 58-2283

1008 06/89

Betreff / Ref.:

Refer your fax no. 89/90 from 18. June 1990

Dear Mr. Ingelbrecht,

Thank you for the opportunity of an announcment in your newsletter. Please use the following text.

Equipment for the installation in controlled areas available

The decommissioning of the production facilities of NUKEM GmbH yields equipment like glove boxes, furnaces or laboratory furniture. Until december 1988 NUKEM did fabricate uranium and thorium products. The fabrication equipment derives from production lines, analytical laboratories and research and development installations. It is fully functionable and in accordance with the demands of the radiation protection regulations.

It is available to institutions, which can use it further on in controlled areas.

Interested parties please contact:

NUKEM GmbH
Rodenbacher Chaussee 6
D-6450 Hanau 11

Phone:
E. Wehner 06181-58-2143
P. Börner 06181-58-2329
Fax 06181-58-2283

Sincerely

E. Wehner

TARGET REQUEST

From : Dr. W.R. Dodge
Center for Radiation Research
Bldg. 245, Rm B109
NIST
USA - Gaithersburg, MD 20899

I. Requirements or problems for present or near future experiment

(1) Sample/target specifications

.25 mg/cm2 Permandur foil 5 x 10 cm in area

(2) Brief description of the experiment

Møller foil in a Møller polarimeter at MIT Betes. Need thickness uniformity ± 1 % or best effort.

II. Request for future planned experiment ("Wish List")

(1) Desired sample/target specifications

(1) Target material is an alloy commercial known by several names among which is permandur. The alloy is 49% FE, 49% CO, and 2% VA.
(2) Target thicknesses and uniformity desired are less than .1 MG/CM**2 and thicknesses varies less than 2% over a 10 CM**2 area centered in a 10 x 10 CM target.
(3) The target should be annealed so it can be constrained to an approximately planar shape which is compatible with (2).

(2) Brief description of planned experiment

The target will be used in a moller polarimeter to determine the polarization in a number of experiments at the MIT/Bates electron accelerator laboratory. A very thin target is needed so that both the recoil electron and the scattered electron can be detected in coincidence.

III. Your comments/suggestions on sample/target problems

TARGET REQUEST

From : Institute: Instituto de Pesquisas Energéticas e Nucleares-IPEN-CNEN/SP
Divisão de Física Nuclear - TFF

Address: Caixa Postal 11049 - Pinheiros - CEP: 05499
São Paulo - Brazil

Name (Requestor): DR. LUIZ PAULO GERALDO

I. Requirements or problems for present or near future experiment

(1) Sample/target specifications : Am-243 and Cm-244 targets

- characteristics
- electrodeposited samples with any active diameter in the interval from 30 to 50 mm.
- It is necessary at least 300 mg of electrodeposited material for each targe (independent of the number of samples).

(2) Brief description of the experiment

A new experiment is being mounted at the 2MW IEA-R1 reactor in order to produce 30 discrete gamma rays, with energies ranging from 5 to 11 MeV, following thermal neutron capture in several materials. With this experimental apparatus we are planning to carry a systematic study of photonuclear reactions for the actinide nuclei where Am-243 and Cm-244 would be the first of them.

II. Request for future planned experiment ("Wish List")

(1) Desired sample/target specifications : Pa-231 and Pu-242 targets

characteristics: as above

(2) Brief description of planned experiment

As the previous nuclei, Pa-231 and Pu-242 were not studied yet with this type of gamma source. So would be also interesting to perform the same systematic study for these two nuclei.

III. Your comments/suggestions on sample/target problems

INFORMATION REQUEST

From : I. Torök
ATOMKI
Institute of Nuclear Research of the
Hungarian Academy of Sciences
P.O.B. 51
Hungary - Debrecen 1, H-4001

I have found a former INTDS brochure (INDC(NDS)-200/G,MY) from which I learn (page 37), that at the 1981 Israel Meeting of the INTDS G. Hinn gave a lecture on the "Production of Thick Elemental Low-Oxygen Content Magnesium Targets".

Can anyone send me a copy of this paper ?

WHICH TARGET MAKER WOULD LIKE TO STAY AT CBNM FOR AN UP-TO-1 YEAR PERIOD AS A VISITING SCIENTIST ?

To increase its scientific vitality and flexibility the new stafff policy of the Joint Research Centre of the Commission of the European Communities encourages senior scientists to participate actively in EC-research projects. In this frame the Sample Preparation Group of the Central Bureau for Nuclear Measurements (CBNM) would be interested to welcome a visiting scientitst to work in its laboratories on the development of reliable methods for the preparation of actinide deposits by electro-deposition. CBNM refunds travelling expenses and pays a monthly allowance of 2000 to 4500 USD.

Candidates may receive more information and application forms from :

C.B.N.M. - Sample Preparation Group
Attn. : J. PAUWELS
Steenweg op Retie
B - 2440 Geel, Belgium

Tel. : + 32 - 14 - 571600
Fax : + 32 - 14 - 584273