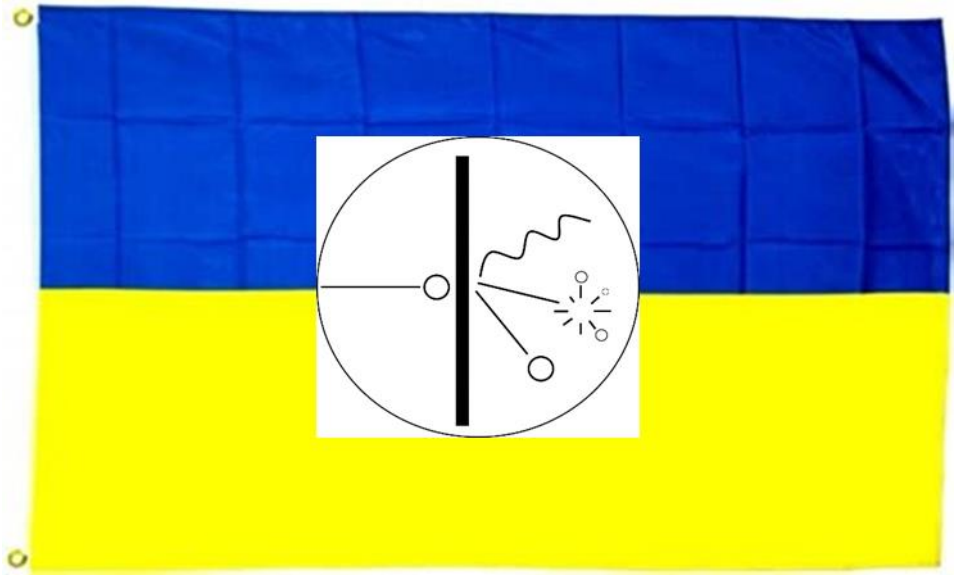
INTDS NEWSLETTER

International Nuclear Target Development Society



May 2022

Volume 48

EBIS charge breeder at ATLAS, Argonne National Laboratory, USA

Content

1 Editorial

Dear Members of the INTDS!

At least in Europe, COVID-19 has become somewhat tamer. Let us hope that the pandemic will decrease worldwide and will not just take a new run-up!

Still, Russia's invasion of Ukraine creates, beside the human tragedy for the people, many new problems and concerns for all of us. Moreover, the INTDS stands with the people of the Ukraine as expressed here and on the INTDS website. Without claiming completeness, we would like to refer to the offers on the websites of the members' institutes:

https://home.cern/solidarity-ukraine

https://www.gsi.de/ukraine

https://home.infn.it/en/press-releases/press-release-2021/4725-per-l-ucraina-2

https://www.psi.ch/de/pa/unterstuetzung-fuer-die-ukraine

https://en.uw.edu.pl/ukraine/

Please, do not forget to register for the 30th INTDS conference at PSI, Switzerland and let us hope that many of our longtime members as well as our new members will be able to join! It is high time to meet again in person.

Many thanks to Matt Gott for his contribution about the target laboratory of Argonne National Lab in USA for our series **Target Laboratories of the World** and the photo on the front page.

We thank Richard Fink from ANI for his technical contribution on "Targets of Isotopes Embedded in Carbon Foils".

Please help us, keeping the Newsletter interesting and informative and send contributions, ideas, advertisements, or whatever you want to share with the INTDS members to INTDS-Newsletter@gsi.de. So please, give yourself a jolt and share some of your tips and tricks with other target makers!

Bettina Lommel and Birgit Kindler

2 Target Laboratories of the World

“Center for Accelerator Target Science”
Argonne National Laboratory, Lemont, Illinois, United States

By Matt Gott

The Argonne Tandem Linac Accelerator System (ATLAS) is the world’s first superconducting linear accelerator for projectiles heavier than an electron. This unique facility can produce high-precision heavy-ion beams ranging from hydrogen to uranium, which are then delivered to many different experimental end stations. ATLAS is a U.S. Department of Energy National Collaborative Research Facility that hosts roughly 200 to 300 users annually from across the world. In support of this wide array of nuclear physics capabilities, the Physics Division at Argonne National Laboratory maintains a target development laboratory in direct support of these efforts.

The target development laboratory at Argonne National Laboratory has been producing targets since the 1960s supporting the ATLAS facility. As ATLAS continued to evolve and grow, the target lab evolved to support it. Recently, it received designation as a national center for the development and fabrication of target and was branded the *Center for Accelerator Target Science* (CATS). As part of its expanded mission, CATS serves the wider low-energy nuclear physics community by producing targets whenever possible and training researchers and students from across the world in target making techniques.

Fig. 1: Evaporator systems in the stable targets laboratory

CATS maintains five laboratory spaces as well as large inventories of old targets. We regularly employ vapor deposition, mechanical rolling, thermal reductions, and thickness determinations by alpha-energy loss measurements for the production of stable targets. In our radioactive spaces, we typically

prepare radioactive targets as drop sources or using molecular plating/electroplating. Our adjacent counting lab allows us to do alpha (PIPS detectors) and gamma spectroscopy (LEPS and HPGe detectors) on the produced targets. We have developed and equipped an R&D lab space, in which we have worked on expanding our powder target production capabilities with a small-scale mill, sieving, pellet press, and an in-house built high-energy vibrational powder plating system. Additionally, we work on developing our electrodeposition techniques in this space. Finally, we recently acquired a scanning electron microscope with energy dispersive spectroscopy for target characterization, elemental analysis, and particle size analysis.

Fig. 2: New scanning electron microscope for target characterization

We aspire to fulfill the mission inherit in our name. As the Center for Accelerator Target Science, we continually produce accelerator targets, perform R&D to advance the science, and act as a center of learning to help train the field, whose future we hope is long and prosperous.

3 Targets of Isotopes Embedded in Carbon Foils

by Richard Fink, ANI Applied NANOTECH INC.

Applied Nanotech Inc. has been providing carbon stripper foils made from dispersions of graphene. These foils are available in wide range of sizes and area mass density. Our approach also allows us the flexibility to modify our dispersion to include nanoparticles or microparticles of isotopes that can be used by the target community. Our targets incorporate nanoparticles of target materials embedded in a carbon foil matrix. For target applications, carbon

nanotubes are also added in the carbon matrix to provide greater mechanical strength. We can provide free-standing thin targets with carbon to isotope compound ratio greater than 50%. With this approach, thin targets can be made from materials that are not otherwise easily made into thin target formats. Rhenium[1], hafnium, tungsten, bismuth, chromium, boron, boron-10, iridium in the range of 1-10 mg/cm^2 have been delivered to customers using this approach. The target particles can be metals, oxides, carbides, and other compounds (dependent on target requirements).

Key Advantages

- Near-100% material efficiency of incorporating the isotopes into the carbon matrix (i.e., very little waste of material in target fabrication).
- Improved thermal conductivity. The carbon matrix provides a path to dissipate heat by a couple of channels: (1) thermal conduction through the carbon matrix, and (2) thermal radiation from the carbon matrix.
- Wide variety of targets can be made (natural metals, isotopes, oxides, carbides and other compounds can be considered). Since water is used as the dispersion vehicle, it is important that all materials be compatible with water. For example, salts that may dissolve in water or materials that will strongly react with water will not be compatible. Organic vehicles can be developed for materials not compatible with water.
- Front-loading of the isotopes is also possible. This occurs naturally in many cases as the isotope/target particles rarely have the same suspension in the dispersion as the carbon and thus collect on one side of the foil more than the other side. In addition, the foils can be used as surfaces to deposit isotope materials, such as sputter coating a surface with an isotope or natural material.
- No binder materials included. Target consists of target metal or compound and carbon matrix.

The products are made in the USA under ISO-9001:2015 quality standards. Images of some examples are provided below.

For more information concerning how Applied Nanotech might collaborate with you to supply your target requirements, please contact Richard Fink (dfink@nanomagic.com, anisales@nanomagic.com).

[1] John P. Greene, Matthew Gott, Richard L. Fink, and Igor Pavlovsky, "Rhenium and iridium targets prepared using a novel graphene loading technique", EPJ Web of Conferences 229, 06001 (2020), UBTDS2018, https://doi.org/10.1051/epjconf/202022906001

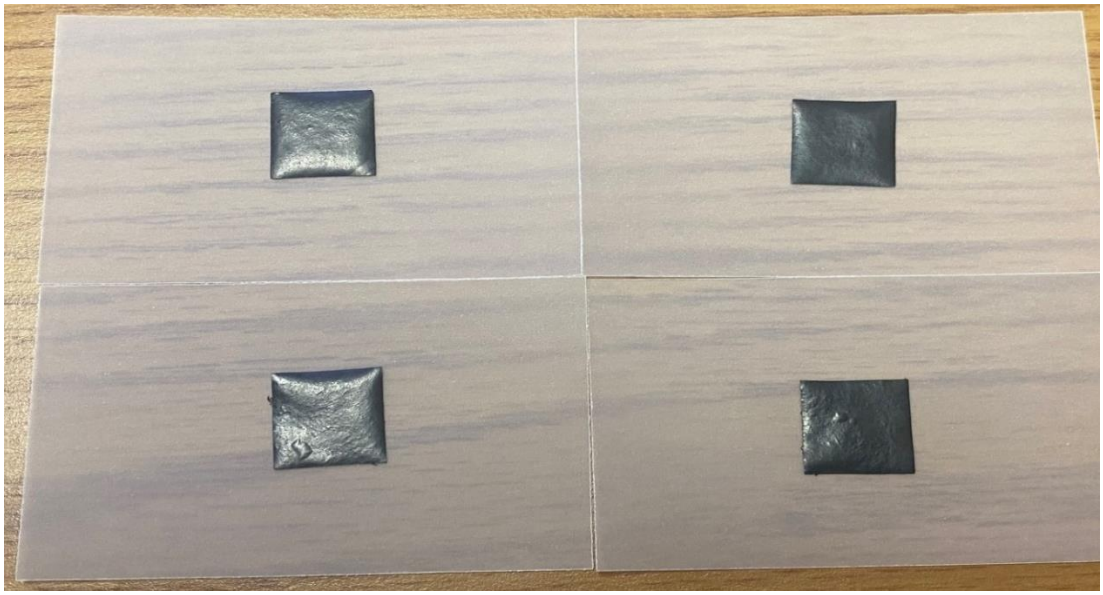


Fig. 1: Rhenium-impregnated foils
(5 mg/cm² rhenium in 2 mg/cm² carbon), area 13 mm x 13 mm

Fig. 2: 10 mg/cm² natural boron + 5 mg/cm² carbon.
Disc is 12.5 cm in diameter

Acknowledgment: This material is based upon work supported by the U.S. Department of Energy, Office of Science, Office of Nuclear Physics under Award Number DE-SC0017208. I gratefully acknowledge the assistance and encouragement of John Greene and Matt Gott at Argonne National Lab.

8200 CAMERON ROAD, SUITE B160, AUSTIN, TX 78754
PHONE (512) 339-5020 X130 ♦ NANOMAGIC.COM/ANI/ ♦ SALES@APPLIEDNANOTECH.NET

4 30th INTDS conference 2020/2022

Just have a look at https://indico.psi.ch/event/7834/ !

5 INTDS worldwide resonance

This time our internet research yielded two hits

What does INTDS mean? - Definition of INTDS - INTDS stands for International Nuclear Target Development Society. By AcronymsAndSlang.com

What does INTDS mean? - Definition of INTDS - INTDS stands for International Nuclear Target Development Society. By AcronymsAndSlang.com

Image Source:

http://acronymsandslang.com/acronym_image/

Image HTML:

<img src='http://acronymsandslang.com/acrony

HTML with link:

<a href='http://acronymsandslang.com/definitio

Share this picture:

Tweet

Most popular questions people look for before coming to this page

Q: What does INTDS stand for?
A: INTDS stands for "International Nuclear Target Development Society".

Q: How to abbreviate "International Nuclear Target Development Society"?
A: "International Nuclear Target Development Society" can be abbreviated as INTDS.

Q: What is the meaning of INTDS abbreviation?
A: The meaning of INTDS abbreviation is "International Nuclear Target Development Society".

Q: What is INTDS abbreviation?
A: One of the definitions of INTDS is "International Nuclear Target Development Society".

Q: What does INTDS mean?
A: INTDS as abbreviation means "International Nuclear Target Development Society".

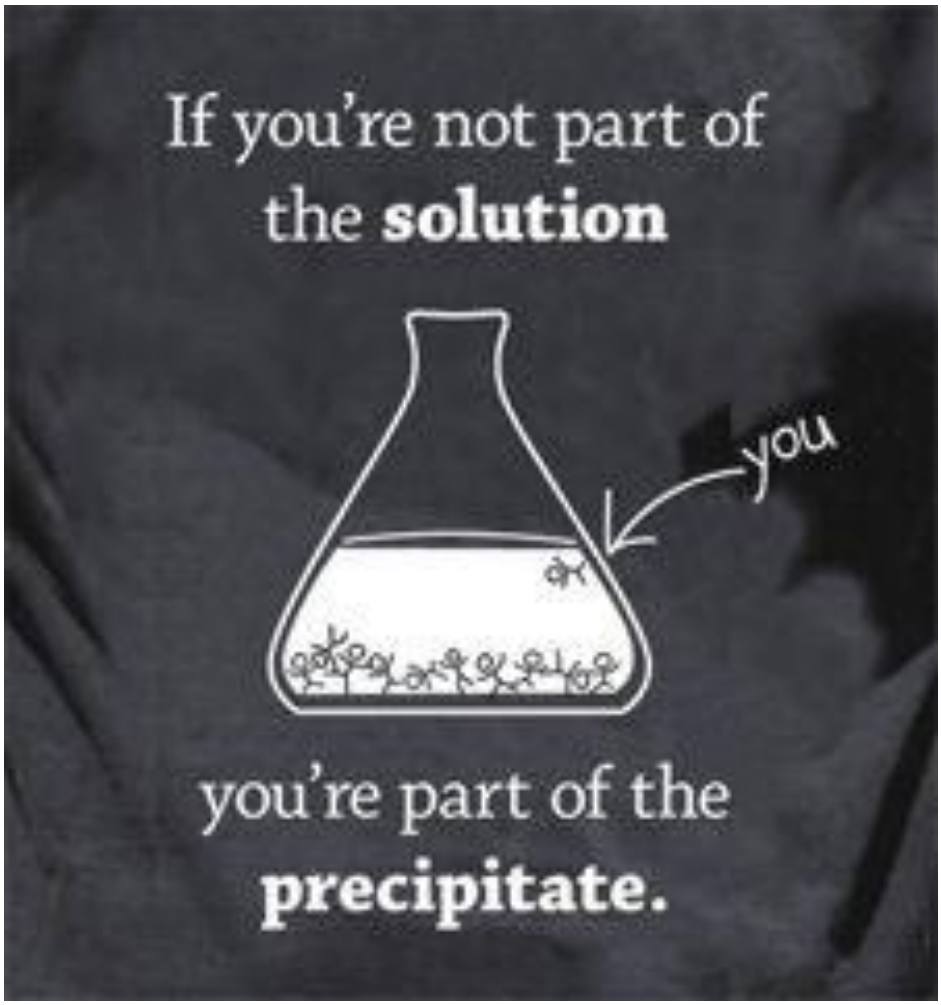
Q: What is shorthand of International Nuclear Target Development Society?
A: The most common shorthand of "International Nuclear Target Development Society" is INTDS.

INTDS puts NRF-iThemba LABS in the spotlight!
December 6, 2021

https://tlabs.ac.za/intds-puts-nrf-ithemba-labs-in-the-spotlight/

6 Advertising

7 Laughs for Target Makers



!

Source: www.cplabsafety.com or CP Lab Safety

For further information on the INTDS, please refer to our website on www.intds.org.