

FOR IMMEDIATE RELEASE

The Anders Gustaf Ekeberg Tantalum Prize 2021: SHORTLIST ANNOUNCED

Brussels, Belgium, July 9th 2021

Recognising excellence in tantalum research and innovation

The Anders Gustaf Ekeberg Tantalum Prize ('Prize') is awarded annually for outstanding contribution to the advancement of the knowledge and understanding of the element tantalum (Ta).

Announcing the 2021 shortlist, the Secretary General of the T.I.C., Emma Wickens, said that technology-driven innovations will ensure the long-term future of the tantalum market and that the Ekeberg Prize will encourage research and development. "Winners of the Anders Gustaf Ekeberg Tantalum Prize will be acknowledged as true leaders in this field", she added.

The award is administered by the Tantalum-Niobium International Study Center (T.I.C.), the global trade body representing the tantalum and niobium industry.

The seven publications on the short list show the great versatility of tantalum:

- Tantalum-titanium alloys for additive manufacturing applications
- Microwave preparation of polyoxoniobates and polyoxotantalates
- An examination of why it is so difficult to cut tantalum metal
- Integrating tantalum pentoxide waveguides into niobium-titanium nitride superconducting nanowires
- Using oxalic-nitric acid to dissolve and separate niobium and tantalum
- Ultrahigh thermal conductivity of θ -phase tantalum nitride
- Creating homostructural Ta₃N₅ nanotube/nanoparticle photoanodes for water splitting

The winner will be chosen by the independent panel of experts and the Prize medal, made from pure tantalum metal, will be awarded at the T.I.C.'s 62nd General Assembly (annual conference) scheduled to be held in London, UK, in November 2021. The T.I.C.'s conference is the largest annual gathering of tantalum and niobium industry leaders, with delegates from every sector of the global industry.

In 2020 the Ekeberg Prize was awarded to a team from Edinburgh University, UK, led by Prof. Jason Love, for *Tantalum recycling by solvent extraction: chloride is better than*

fluoride published in the journal *Metals*. Information about this paper, and photos from the award ceremony, are available in the T.I.C.'s quarterly magazine [Bulletin #183](#).

Ekeberg Prize Shortlist 2021

Microwave synthesis of alkali-free hexaniobate, decaniobate, and hexatantalate polyoxometalate ions

Authors: Mark A. Rambaran, Magda Pascual-Borràs and C. André Ohlin
Organisations: Department of Chemistry, Umeå University, Umeå, Sweden
European Journal of Inorganic Chemistry, Volume 2019, Issue 35, pages 3913-3918
Full article at: <https://chemistry-europe.onlinelibrary.wiley.com/doi/abs/10.1002/ejic.201900750>

Osteogenic potential of additively manufactured TiTa alloys

Authors: Erin G. Brodie^{1,2*}, Kye J. Robinson³, Elizabeth Sigston^{4,5}, Andrey Molotnikov^{1,2,6}, Jessica E. Frith^{1*}
1. Department of Materials Science and Engineering, Monash University, Clayton, VIC, 3800, Australia
2. Monash Centre for Additive Manufacturing (MCAM), 11 Normanby Road, Nottingham, VIC, 3168, Australia
3. Department of Inorganic and Analytical Chemistry, University of Geneva, CH-1211 Geneva, Switzerland
Organisations: 4. Department of Surgery, School of Clinical Sciences at Monash Health, Monash University, Clayton, VIC, 3800, Australia
5. Department of Otolaryngology, Head and Neck Surgery, Monash Health, Clayton, VIC, 3168, Australia
6. RMIT Centre for Additive Manufacturing, School of Engineering, RMIT University, Melbourne, Australia
Full article at: ACS Appl. Bio Mater. 2021, 4, 1003–1014
<https://pubs.acs.org/doi/10.1021/acsabm.0c01450>

Cutting of tantalum: why it is so difficult and what can be done about it

Authors: Jason M. Davis^{ab}, Mojib Saei^a, Debapriya Pinaki Mohanty^a, Anirudh Udupa^a, Tatsuya Sugihara^c, Srinivasan Chandrasekar^a
A. Center for Materials Processing and Tribology, Purdue University, West Lafayette, IN, 47907-2023, USA
Organisations: B. Special Warfare and Expeditionary Systems Department, Naval Surface Warfare Center, Crane Division, Crane, IN, 47552, USA
C. Department of Mechanical Engineering, Osaka University, Suita, Osaka, 565-0871, Japan
Full article at: International Journal of Machine Tools and Manufacture, Volume 157, October 2020, 103607;
<https://doi.org/10.1016/j.ijmachtools.2020.103607>

Superconducting nanowire single-photon detectors integrated with tantalum pentoxide waveguides

Authors: Martin A. Wolff^{abc}, Simon Vogel^{abc}, Lukas Splitthoff^{abc}, Carsten Schuck^{abc}

Organisations: A. Institute of Physics, University of Münster, Wilhelm-Klemm-Str. 10, 48149, Münster, Germany
B. CeNTech – Center for Nanotechnology, Heisenbergstr. 11, 48149, Münster, Germany
C. SoN – Center for Soft Nanoscience, Busso-Peus-Straße 10, 48149, Münster, Germany

Full article at: Scientific Reports volume 10, Article number: 17170 (2020)
<https://www.nature.com/articles/s41598-020-74426-w>

Homostructural Ta₃N₅ nanotube/nanoparticle photoanodes for highly efficient solar-driven water splitting

Authors: Xian Zhang^{a,b}, Huilin Guo^a, Guojun Dong^b, Yajun Zhang^b, Gongxuan Lu^b and Yingpu Bi^{b,c}

Organisations: A. Key Laboratory of Synthetic and Natural Functional Molecule Chemistry (Ministry of Education), College of Chemistry and Materials Science, Northwest University, Xi'an, 710127, PR China
B. State Key Laboratory for Oxo Synthesis & Selective Oxidation, Lanzhou Institute of Chemical Physics, CAS, Lanzhou, 730000, PR China
C. Dalian National Laboratory for Clean Energy, CAS, Dalian, 116023, PR China

Full article at: Applied Catalysis B: Environmental, Volume 277
<https://www.sciencedirect.com/science/article/abs/pii/S0926337320306329>

Ultrahigh thermal conductivity of θ -phase tantalum nitride

Authors: Ashis Kundu^{1,2}, Xiaolong Yang^{1,2}, Jinlong Ma^{1,4}, Tianli Feng⁵, Jesús Carrete³, Xiulin Ruan⁶, Georg K. H. Madsen³, Wu Li¹

Organisations: 1. Institute for Advanced Study, Shenzhen University, Shenzhen 518060, China
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3. Institute of Materials Chemistry, TU Wien, 1060 Vienna, Austria
4. School of Energy and Power Engineering, Huazhong University of Science and Technology, Wuhan 430074, China
5. Department of Mechanical Engineering, University of Utah, Salt Lake City, Utah 84112, USA
6. School of Mechanical Engineering and the Birck Nanotechnology Center, Purdue University, West Lafayette, Indiana 47907-2088, USA

Full article at: Phys. Rev. Lett. 126, 115901 (2021)
<https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.126.115901>

Niobium and tantalum processing in oxalic-nitric media: Nb₂O₅-nH₂O and Ta₂O₅-nH₂O precipitation with oxalates and nitrates recycling

Authors: Gauthier J.-P. Deblonde^{abc}, David Bengio^b, Denis Beltrami^b, Sarah Bélair^b, Gérard Cote^a, Alexandre Chagnes^d

Organisations: A. PSL Research University, Chimie ParisTech – CNRS, Institut de Recherche de Chimie Paris, 11 rue Pierre et Marie Curie, 75005 Paris, France
B. ERAMET IDEAS, 1 avenue Albert Einstein, 78193 Trappes, France
C. Lawrence Berkeley National Laboratory, Chemical Sciences Division, Berkeley, CA 94720, USA
D. Université de Lorraine, CNRS, GeoRessources, 54000 Nancy, France

Full article at: Separation and Purification Technology, Volume 226, 1 November 2019, Pages 209-217;
<https://www.sciencedirect.com/science/article/abs/pii/S1383586619320817?via%3Dihub>

About the Ekeberg Prize

The Ekeberg Prize is the annual award that recognizes excellence in published research about the element tantalum (Ta). The long-term future of the tantalum market will depend on technology-driven innovations and a new prize dedicated to this rare and critical element will encourage research and development. The Ekeberg Prize increases awareness of the many unique properties of tantalum products and the applications in which they excel.

A T.I.C. spokesman said “Winners of the Anders Gustaf Ekeberg Tantalum Prize are acknowledged as true leaders in this field.” Further information is available at <https://www.tanb.org/view/prize>.

About Dr Anders Gustaf Ekeberg

Born in 1767, Anders Gustaf Ekeberg was a Swedish scientist, mathematician, and poet. He became a professor at Uppsala University in 1794 and initially made his name by developing advanced analytical techniques and by proposing Swedish names for the common chemical elements according to the principles set out by the "father of modern chemistry" Antoine-Laurent de Lavoisier. Ekeberg discovered the oxide of tantalum in 1802, isolating it from samples of two different minerals. According to Ekeberg's friend, the chemist Jacob Berzelius, Ekeberg chose the name 'tantalum' partly to reflect the difficulties that he had experienced in reacting the new element with common acids and partly out of his passion for ancient Greek literature. Tantalus was a demi-god who killed and cooked his son, Pelops, and as punishment was condemned to stand in a pool of water beneath a fruit tree with low branches, with the fruit ever eluding his grasp, and the water always receding before he could take a drink.

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About the Tantalum-Niobium International Study Center (T.I.C.)

Since its inception the Tantalum-Niobium International Study Center (T.I.C. or the Association) has grown and developed to encompass the changing nature of the tantalum and niobium industries and will continue in the same spirit in facing future challenges. After initially focusing on just tantalum, in 1986 niobium joined the association and today our membership represents every aspect of the global tantalum and niobium industries.

The Association:

- An international, non-profit association founded in 1974 under Belgian law.
- Around 90 member companies from over 30 countries involved with all aspects of the tantalum and niobium industry supply chain (including mining, trading, processing, recycling, metal fabrication, capacitor manufacturing, medical...).
- The Association is run by its Executive Committee. This Committee reflects the range of activities of the members and covers the geographic spread of the membership, too. Presidents have been drawn from all sectors of the industry and from many parts of the world. Elections are held annually.

Objectives:

- Increase awareness and promote the remarkable properties of tantalum and niobium in all their forms.
- Disseminate information on any matter affecting that industry, excluding price and related information and any other proprietary information.
- Address major issues and challenges facing its industry such as conflict minerals legislation, artisanal and small-scale mining (ASM), and the transport of naturally occurring radioactive materials (NORM).
- Organize a General Assembly of the membership in September or October each year for business and technical presentations. Typically, this includes a field trip to a member company or associated industrial facility.
- Publish a quarterly Bulletin newsletter containing interesting and informative articles about the T.I.C. and the global tantalum and niobium industries.
- Collect statistics from member companies (via an independent company to ensure confidentiality) on tantalum and niobium production, shipments and consumption. Participating members receive quarterly statistics updates.

Contact:

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