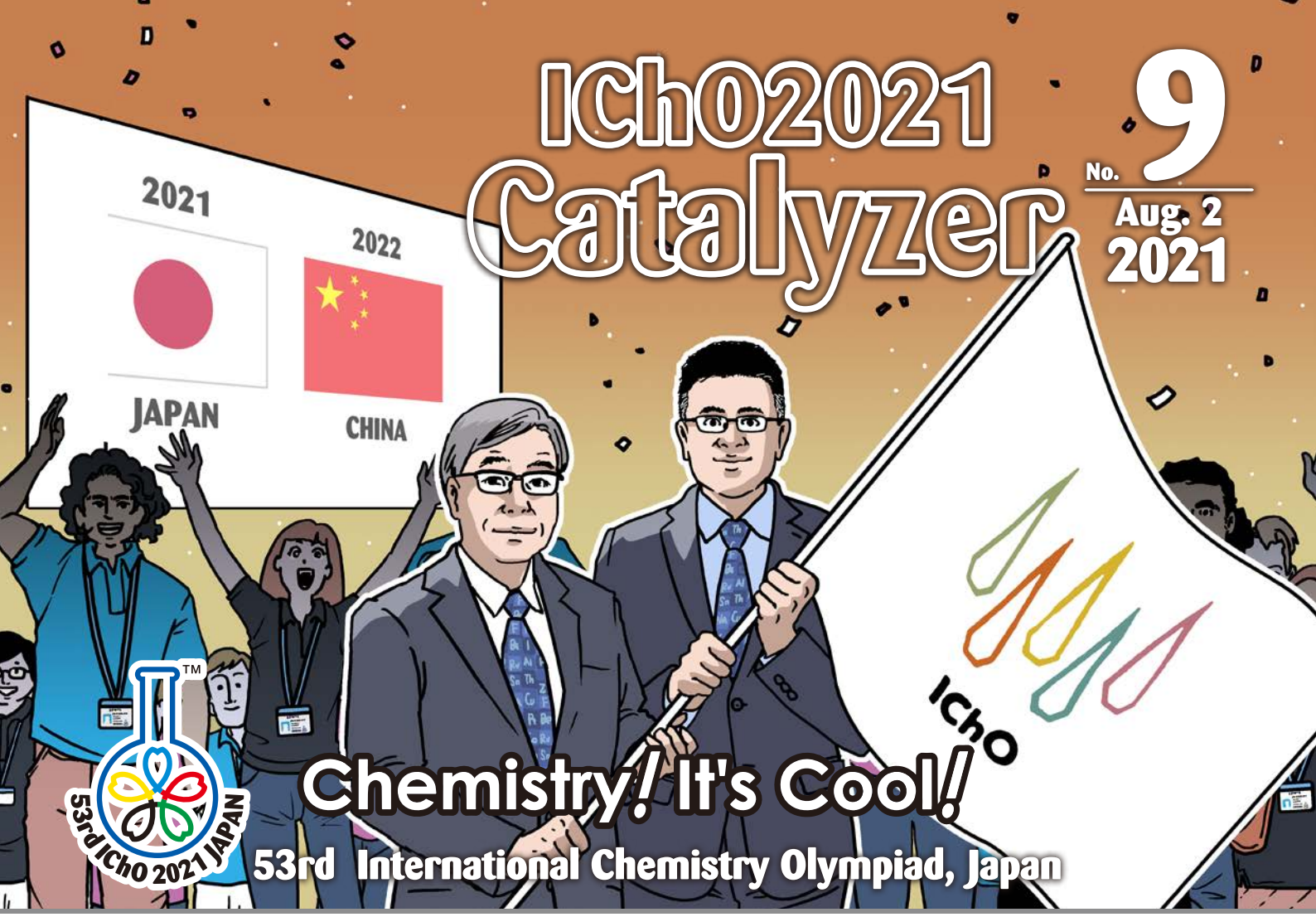
IChO2021 Catalyzer
No. 9
Aug. 2 2021



Cover illustration : IChO flag Ceremony

Welcome Message from China ··· IChO2022

We are looking forward to welcoming you from all over the world to participate in the 54th Chemistry Olympiad in 2022, at Nankai University, in Tianjin city. Tianjin, a meaning of the 'emperor's docks,' resides in Northern China, the key junction of transportation and communication for China and its connection with the world.

As the Vice-Chancellor of Nankai University, it is my greatest pleasure to introduce Nankai University as the 54th IChO host. Founded in 1919, Nankai University has played a vital role in Chinese education over the last 100 years. Today, Nankai has grown to three modern university campuses, plus a full range of educational institutions. Nankai University is a leading multidisciplinary and research-oriented state university, consisting of 26 colleges, covering areas from natural science to humanities, at all levels. As a member of the Global University Leaders Forum, Nankai University strives continuously to deepen its internationalization and globalization process, both in education and research. Not only does Nankai offer opportunities for students to study abroad, but it also provides a growing number of well-supported international studentships and scholar bursary programs each year. These broaden our academic horizons and contribute to building a worldwide academic community and a shared future for humankind.

As a chemist, I have found that Chemistry can start from simple concepts and extend to understand the complexities of the world. Here at Nankai, one is always encouraged to develop social responsibility, practical capabilities, and a creative spirit. This spirit is coincidently shared with the IChO, so we are genuinely looking forward to welcoming the young Olympians to Nankai University, bringing sparks of inspiration and ideas, scientific talent, and starting friendships. Right now, we are working as hard as possible to ensure you will have a safe, and a special IChO in China. We sincerely hope that the pandemic will be over and the world will go back to normal quickly.

Finally, we are looking forward to welcoming you to Tianjin, in 2022!

Prof. Jun Chen
The Chair of the Organizing Committee of IChO2022
The Vice-Chancellor of Nakai University

IChO2021 Japan Closing Remarks by Vice President of IChO2021

Thank you for kind introduction. My name is Kyohei Takahashi, and I'm originally from a Japanese chemical company, and also ex-Chairman of Japan Chemical Industry Association, an association of all Japanese chemical companies. In Japan, academic society and industry association jointly continue to contribute to overall chemical society, and it is my honor to work as a representative from the chemical industry in this International Chemistry Olympiad Japan Committee.

The 53rd International Chemistry Olympiad in Japan, or IChO2021 Japan, will be closed today after the fruitful session of 9 days. Although due to the ongoing COVID-19 pandemic, we had to have the meetings by WEB system, we had participants from 85 countries and regions. This is the largest number IChO has ever had.

This was made possible by the devoted efforts of the Steering Committee and Chairman Dr. Gábor Magyarfalvi, all national contacts of each country and region, and those who conducted selection of student representatives. I would like to express our sincere thanks to all of you. In addition, thanks to the grate efforts of all mentors, science observers, and invigilators, examinations in all countries and regions were fairly conducted. I really appreciate your efforts and cooperation.

In the host country Japan, sponsorship was provided for us by many governmental agencies including Ministry of Education, Culture, Sports, Science and Technology, Ministry of Economy, Trade and Industry, Japan Science and Technology Agency, and more than 180 chemical companies and associated companies. Here I would like to report that this IChO has been operated under the partnership of All-Japan. Let me express my heartfelt thanks to all organizations and persons who supported us.

Now all of more than 300 students from all over the world taking part in IChO2021 Japan, thank you for your on-line participation despite this difficult situation! Did you demonstrate your ability and results of your daily efforts to the full? I believe all of you did! Properly speaking, you should come to Japan, become good friends with other students, and directly feel Japanese science, technology, society, and culture. However, we could not invite you to Japan due to the pandemic. Nevertheless, we provided you with many extraordinary programs and events only an on-line would be capable of. We provided you with virtual-tour of SPring-8, which is the world's largest radiation facility, and on-line visit to Buddhist temples, Himeji Castle, Kyoto, and Osaka. I am sure you enjoyed these virtual tours! We also hope you enjoyed communication with many new friends from all over the world in the virtual space.

For all of you who gloried as gold, silver, and bronze medal winners, congratulations! Your past effort comes into full bloom now! Also, let me congratulate all other students participated, because taking part in the IChO as representatives from your country or region is an honor you should be proud of. Your experience of this time will let you gain great self-confidence and support in your future.

Chemistry has infinite potential. The chemical industry is the only industry which has a name of science in its name, while other industries, such as the automobile industry and the steel industry, are called with names of products. This is because the chemical industry is based on chemical technology. Our industry manufactures various products, and chemistry is utilized in every possible scene of our life. Therefore, we can say that the chemical industry is the blood for all other industries.

Today we are facing global-scale problems such as global environmental issues, natural resource problems, and energy problems. These problems may jolt the future of human beings. As you know, the UN Sustainable Development Summit held in September 2015 adopted a set of international development goals called "Sustainable Development Goals" known as SDGs and most of such 17 goals requires innovations by chemistry. We believe and hope young people like you, who have rich knowledge and capability about chemistry, will lead the achievement of such goals. My dear students, this time you represented your home countries. But in the future, you must lead chemistry in the world, you must work together with other participants in this IChO, and you must make great contribution to the solution of difficult global problems. My young friends, please have high aims, and attempt new challenges!

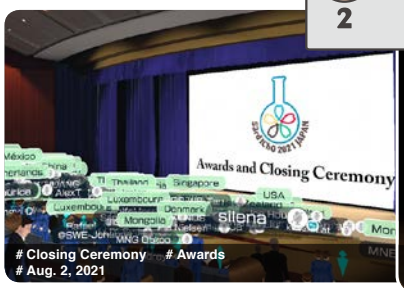
At the end of my closing address, I wish you great success in your bright future. Thank you very much and good luck!

Kyohei Takahashi
Vice President, IChO2021 Japan Committee
Vice Chair, Organizing Committee
for the 53rd IChO2021, Japan

Awards and Closing Ceremony

Program

- Opening Movie
- Introduction of Sponsors
- Explanation of Examination by Prof. Hiroshi Nishihara
  Chair of the Science Committee
- Awards Ceremony
- Message from Prof. Gábor Magyarfalvi
  Chair of the Steering Committee
- Closing Remarks by Kyohei Takahashi
  Vice President of IChO2021 Japan Committee
  Vice Chair of IChO2021 Organizing Committee
- Introduction of Organizing Committee Members
- IChO Flag Handover Ceremony
- Welcome Message from Prof. Jun Chen
  Chair of the Organizing Committee of IChO2022
  Vice-Chancellor of Nankai University
- Closing Movie

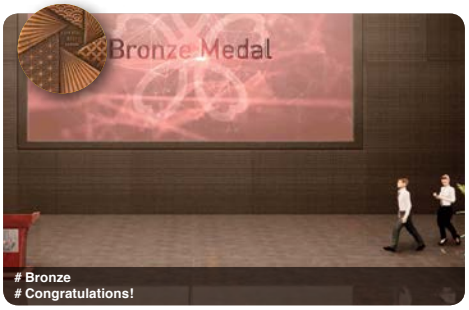


Closing Ceremony # Awards
Aug. 2, 2021

Top 3 of Gold Medalists # 1st, Shu Yang # 2nd, Zhangyi Huang # 3rd, Xinyu Cai
Congratulations! # 3 avatars with reflecting winner's faces

Gold
Congratulations!

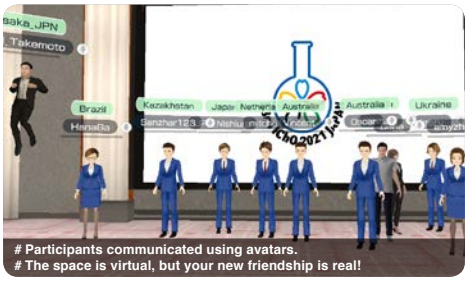
Silver
Congratulations!

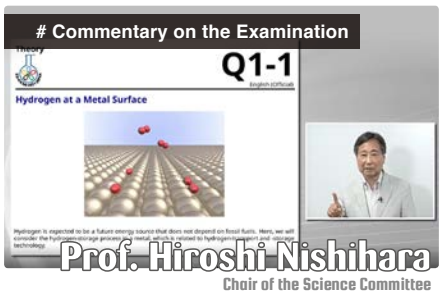


Bronze
Congratulations!

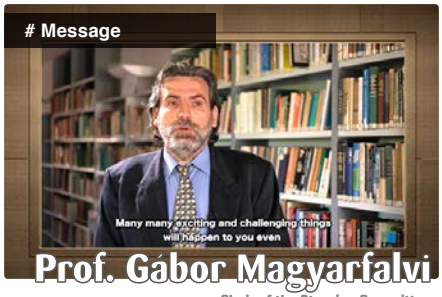
Honorable Mention
Congratulations!


Avatars attended
Remote # Virtual venue


Participants communicated using avatars.
The space is virtual, but your new friendship is real!



Prof. Hiroshi Nishihara
Chair of the Science Committee



Prof. Gábor Magyarfalvi
Chair of the Steering Committee

Kyohei Takahashi
Vice President of IChO2021 Japan Committee

Prof. Jun Chen
Chair of Organizing the Committee of IChO2022
Vice-Chancellor of Nankai University

Congratulations!!

IChO2021 Japan

Jul. 25 (Sun.) – Aug. 2 (Mon.) 2021

Remote Examination

Jul. 28 (Wed.)

Participants (85 Teams)

521 Total Participants
- 312 Students
- 157 Mentors
- 52 Observers and Guests

183 Invigilators

Awards

Gold Medal : 33
Silver Medal : 67
Bronze Medal : 94
Honorable Mention : 24

Best of IChO2021

1 **Shu Yang** China	2 **Zhangyi Huang** China	3 **Xinyu Cai** China

Gold

Shu Yang	China	Cheng Jun Nicholas Goh	Singapore
Zhangyi Huang	China	Nir Cohen	Israel
Xinyu Cai	China	Timofey A. Charkin	Russian Federation
Bangsen Zhao	China	Tudor Lile	Romania
Sobirjon Amanov	Uzbekistan	Adarsh Reddy Madur	India
Mircea Raul Bodrogean	Romania	Mahbod Alian Fini	Iran
Aleksandr E. Trofimov	Russian Federation	Deniz Guner	Turkey
Anh Duy Nguyen	Vietnam	Andrei S. Tyrin	Russian Federation
Bo-An Chen	Chinese Taipei	Dhananjay Raman	India
Georgii M. Zhomin	Russian Federation	Yitian Zhu	United States of America
Chun-Cheng Ting	Chinese Taipei	Filip Hůlek	Czech Republic
Phuong Duc Nam Pham	Vietnam	Harry John List	United Kingdom
Qiyang Zhou	United States of America	Anh Le Thao Nguyen	Vietnam
Berkan Tarak	Turkey	Mahyar Afshinmehr	Iran
Chen Yizhou	Singapore	Myeongjin Shin	Korea
Alexander Ramsay Thow	United Kingdom	Alexandru Catalin Dianu	Romania
Rui-Xi Wang	Chinese Taipei		

Silver

Duong Hoang Nguyen	Vietnam
Stefan Dimitriu	Romania
Sebnem Gul	Turkey
Uladzislau Hlatankou	Belarus
Alphonsus Yu Xiang Neo	Singapore
Michal Piotr Lipiec	Poland
Oscar Dong	Australia
Seung Jae Kang	Korea
Nikhil Seshadri	United States of America
Faatih Regind Qashash Roman	Indonesia
Bernard Tze Wei Kwee	Singapore
Hsuan-Ting Lin	Chinese Taipei
Mahit Rajesh Gadhiwala	India
Seyed Mohammad Hossein Barakati	Iran
Oisín Colm Ó Feinneadha	Ireland
Oleksandr Zaporozhets	Ukraine
Goktug Gulsoy	Turkey
Shahzod Nazirov	Tajikistan
Hee Seong Yoon	Korea
Jirapat Rujirayuk	Thailand
Jovan Marković	Serbia
Linus Albert Schwarz	Germany
Muhammad Barotov	Tajikistan
Vinicius da Silveira Lanza Avelar	Brazil
Lucio Saracco	Hungary
Ioannis Karageorgiou	Greece
Nichawadee Kanjanakosit	Thailand
Davut Muhammetgulyyev	Turkmenistan
Takahiro Takemoto	Japan
Kohei Nishiura	Japan
Bruno Andrzej Skoczen	Poland
Khaidar Kairbek	Kazakhstan
Mohammad Solaiman AlHadlaq	Saudi Arabia
Marek Pavlica	Czech Republic
Ehsan Naderi Donig	Iran
Patrik Žnidaršič	Slovenia
Seoyeon Kim	Korea
Gerel Bayarmagnai	Mongolia
Temujin Orkhon	Mongolia
Kien Phuong	United States of America
Tong Wu	Ireland
Zachary John McGuire	United Kingdom
Rishit Singla	India
Andy Cai	Canada
Lita Tantipraphat	Thailand
Džonatans Miks Melgalvis	Latvia
Yuya Koike	Japan
Mohammad Rashed AlHudaithi	Saudi Arabia
Abdulaziz Abdulrahman AlJuaid	Saudi Arabia
Matúš Tomčo	Slovakia
Itamar Steinitz	Israel
Gozel Dovranova	Turkmenistan
Ron Angelo A. Gelacio	Philippines
Simon Bukovšek	Slovenia
Michael Schembera	Austria
Sanzhar Bissenali	Kazakhstan
Tim Bastian Enders	Germany
Pavel Atanasov Nikolov	Bulgaria
Berdigylych Rejepbayev	Turkmenistan
Dávid Benkő	Hungary
Yusup Dovletmyradov	Turkmenistan
Madiyar Kassymaly	Kazakhstan
Povilas Dapsys	Lithuania
Nathan Wayne F. Ariston	Philippines
Daniils Kargins	Latvia
Jakub Krzysztof Kwiatkowski	Poland
Ihor Kholomieiev	Ukraine

Bronze

Kevin Lius Bong	Indonesia
Tadas Danilevicius	Lithuania
Khanim Yagublu	Azerbaijan
Sathira Jantarakulchai	Thailand
Irmuun Altankhuyag	Mongolia
Kamil Mambetov	Kyrgyzstan
Neta Eiger	Israel
István Babcsányi	Hungary
Samuil Vladimirov Petkov	Bulgaria
Durdona Muxtarxujayeva	Uzbekistan
Lazar Savić	Serbia
Hanif Muhammad Zhafran	Indonesia
Darko Stojchev	North Macedonia
Vladislavs Tiščenko	Latvia
Maciej Swiatek	Austria
Keith Wong	Australia
Johann Sora Blakytny	Germany
Andrei Banica	Canada
Firdavs Sobirov	Uzbekistan
Ketevan Peranidze	Georgia
Abdur-Raheem Idowu	Norway
Ruben Tapia	France
Austin Lin	Australia
Patrik Fábrik	Slovakia
Aigerim Turuspekova	Kazakhstan
Nathanael Reza Putra Widjaja	Indonesia
Edvards Jānis Treijs	Latvia
Georgi Neliyanov Nedyalkov	Bulgaria
Salman Huseynov	Azerbaijan
Cassia Caroline Aguiar da Ponte	Brazil
Angelina Rogatch	Belarus
Benedek Sajósi	Hungary
Alina Tumashyk	Belarus
Nariman Shirinli	Azerbaijan
Saeed Sultan Baghdadi	Saudi Arabia
Ahmad Thaer Ater	Syria
Maha Ali	Syria
Jorge García-Ponce	Mexico
Michael Li	Canada
Lukas Rost	Austria
Teodor Svilenov Maslyankov	Bulgaria
Nadun Naveendra Rajapaksha	Sri Lanka
Yurii Okis	Ukraine
Dimitrije Gligorovski	Serbia
Achira Hansindu Kelambi Arachchige	Sri Lanka
Marina Malta Nogueira	Brazil
Fran Miletic	Croatia
Haruhi Isse	Japan
Jernej Birk	Slovenia
Yangyi Qi	Sweden
Aleksandr Beditski	Estonia
Vincent Ng	Australia
Anas Abbas	Syria
Adam Szymon Sukiennik	Poland
Tomáš Heger	Czech Republic
Ikromiddin Boymahammadov	Uzbekistan
Fynn Lasse Noah Kessels	Germany
Jakub Sochor	Czech Republic
Emilio Alonso Venegas-Hernandez	Mexico
Michael Estes	Denmark
Liis Siigur	Estonia
Jochem van den Broek	Netherlands
Nino Abesadze	Georgia
Hayk Aghekyan	Armenia
Aames Juriel B. Morales	Philippines
Théodore Halley	France
Valerian Mocreac	Moldova
Alexandre Bloquel	France

Laimis Jurkenas	Lithuania
Mahsati Piriyeva	Azerbaijan
Daan Roger Stan Vanhaecke	Belgium
Simonas Melaika	Lithuania
Sandro Pfammatter	Switzerland
Ioane Kapanadze	Georgia
Fredi Manuel Barraza Hernandez	El Salvador
Tatiana Sviriniuc	Moldova
Mason Minghan Liu	New Zealand
Ján Plachý	Slovakia
Oscar Eric Moran Despard	Ireland
Leonid Asatryan	Armenia
Terry Wang	Canada
Hana Gabriela Albuquerque Sousa	Brazil
Tal Sason	Israel
Tigran Harutyunyan	Armenia
Andrei Kornijenko	Estonia
Nevena Stojković	Serbia
Adelina Andrei	Moldova
Samuel Kolesár	Slovakia
Sebastian Jacob Krikke	Netherlands
Paul Johann Dorfer	Austria
Lin Bigom-Eriksen	Denmark
Manujaya Praveen Wijesinghe	Sri Lanka
Kiryl Maroz	Belarus
Maxim Cojocari-Goncear	Moldova

Honorable Mention

Bumchin Dolgormaa	Mongolia
Abhinav Chawla	New Zealand
Aku Hertell	Finland
Daria Klymenko	Ukraine
João Pedro Bonito Caldeira	Portugal
Théo Mignen	France
Ali Marouf	Syria
Olga Jerkovic Peric	Croatia
Sam Wuji Zhuang	New Zealand
Samuel Klaver	Finland
Vid Kavčič	Slovenia
Jessica Rebekka Kurmann	Switzerland
Safwan Sakib	Bangladesh
Gerardo Emiliano Gutierrez-Alvarez	Mexico
Rafael Dux	Luxembourg
Aoife Mary Morris	Ireland
Henri Kärpijoki	Finland
Dinithi Shalika Madhubhashini	Sri Lanka
Daniel Jiyoun Jang	New Zealand
Athanasios Feidakis	Greece
Jean-Marc Furlano	Luxembourg
Vaidik Rajesh Hurkat	United Arab Emirates
Mahin Kamal Sawdager	Bangladesh
Khalid Hasan Tuhin	Bangladesh

Element # 8

Japanese mineral resources
Antimony

Basic Information

Origin of the name: Greek word *anti-monos* (not alone)
Discovered by: known since early history
Global reserves: 1.9 million tons
Major reserve countries: China, Russia, Bolivia
Global production: 153,000 tons
Major producers: China, Russia, Tajikistan

Pyroxene is a mineral composed mainly of antimony sulfide (Sb_2S_3). In Japan, the Ichinokawa mine in Ehime Prefecture on the island of Shikoku used to produce large and beautiful pyroxene specimens. A simple substance of antimony can be obtained by reducing pyroxene with iron, or oxidizing it by combustion first then reducing with carbon. Antimony is still used as an electrode material and as a wear-resistant material for secondary batteries, as well as for flame retardants, type metals, and semiconductors.

© The Courtyard of our Minerals

Answer for Q8

① 1 amber

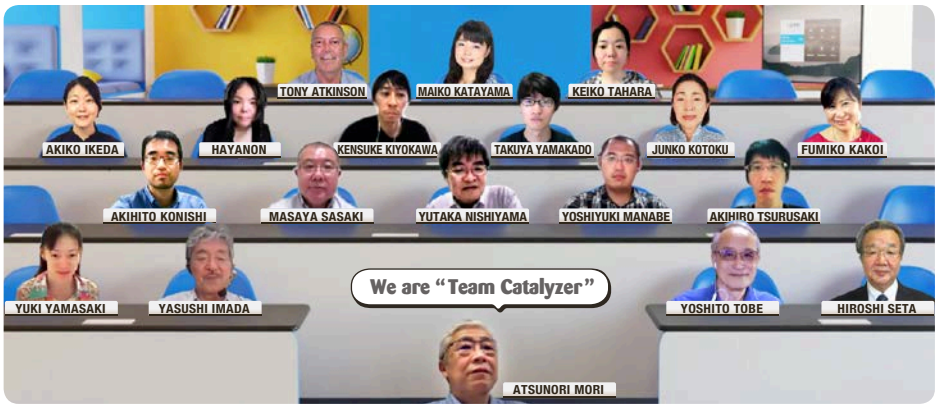
When J. J. Thomson (1856–1940) discovered that cathode ray was actually a stream of particles, G. J. Stoney (1826–1911) named it “electron” after the Greek word *aelectron*, which means amber. It was given the name because the particles were produced by rubbing an amber rod.

② 2 Japan

Japan produces 28% of the world’s selenium (770 tons; 2019 data). Selenium has a range of industrial uses; it is found in applications from electronic devices to pigments, beauty products, and other daily items.

We deeply regret that editing of Catalyzer has mostly been done by remote. We have had little chance to meet and discuss face-to-face upon editing. The photo below is the immersive view in the Zoom meeting of the Team Catalyzer. We hope that human overcomes COVID-19 pandemic soon and the next Chemistry Olympiad the 54th IChO2022 will be held as the really REAL mode.

The Team Catalyzer IChO2021



This popular word has the meaning of “thank you”. Many people in the Kansai area say “Ohkini” at the end of conversation to smooth relations with the person. Ohkini was originally an adverb that indicated large quantities. Therefore, “Ohkini Arigato” is the equivalent of “Thank you very much.” Over the years, this was abbreviated to just “Ohkini.”

Chemistry! It’s Cool!

53rd IChO 2021 JAPAN™

IChO2021 Catalyzer No. 9

Official Website
https://www.icho2021.org/

icho2021

Aug. 2
1932
Discoverd!
Positron
by Carl David Anderson

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