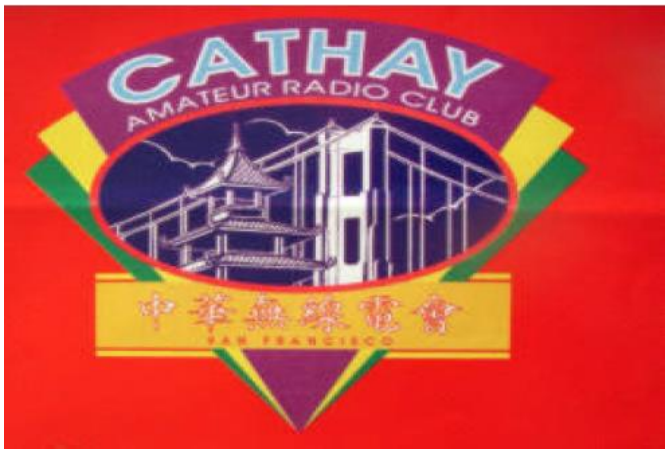


Cathay December 2022

www.cathayradio.org

President: George Chong, W6BUR **email:** *W6BUR@comcast.net*
Vice President North: Leonard Tom, *NX6E* **email:** nx6e@hotmail.com
Vice President South: Bill Fong, *W6BBA* - **email:** w6bba@arrl.net
Secretary/Membership: Rodney Yee, *KJ6DZI* - **email:** rodyee2000@yahoo.com
Editor: Rodney Yee, *KJ6DZI* - **email:** rodyee2000@yahoo.com
Treasurer: Vince Chinn aka Mingie, *W6EE* - **email:** vince@vincechinncpa.com
Web Master: Edison Fong – *WB6IQN* - **email:** edison_fong@hotmail.com
Mission: The Cathay Amateur Radio Club is basically an active social club of Ham Radio Operators and their spouses. We support local community requests for HAM emergency communications. Several of us are trained in CPR/ First Aid and are involved with community disaster preparedness.

Monday Night Net Time: 9 PM Local Time/PST, Repeater: WB6TCS - RX 147.210, TX 147.810, Offset +0.6 MHz, CTCSS/Tone PL100 Hz

Please note: Repeater: N6MNV UHF 442.700 Mhz, Offset +5MHz, CTCSS/Tone PL 173.8 Hz in South San Francisco is cross linked every Monday Night Net at 9 p.m. to WB6TCS 2-meter repeater.

The CARC Monday night net is the best way to find out the latest club news. All check-ins are welcome.

Message from the President: George Chong, *W6BUR*

Hello CARC Members and Friends;

Yes, the 2022 year is rapidly coming to a close. I wish for all you folks to have a Merry Christmas.

In the Spotlight Article Introduction:

This month's Dx article is about our distinguished CARC member: Vincent Chinn in the October 2022 QST magazine.

Many thanks to Ed Fong - *WB6IQN* and Ron Quan – KI6AZB for alerting me about the October 2022 QST magazine article.

Special thanks to Ed Fong for gaining us permission for an extract reprint from QST.

For further information please read the In the Spotlight Article Section.

While on the topic of QST, Ed Fong pointed out that on page 66 of the December 2022 QST magazine reports ARRL Field Day results: K6SNY (SNY for Sunnyvale) received 744 points for making contacts.

Technical Article Introduction:

This month's article discusses a cubic boron arsenide as a possible replacement material for silicon in semiconductor chips.

Final Thoughts

Many thanks to Mr. Denis L. Moore – WB6TCS for the use of his repeater for our CARC Monday Night Net.

I wish to thank our CARC members that set aside their valuable time to participate in our Monday night's nets.

Stay healthy and keep yourself from catching COVID-19.

Chat sub s'em to all you CARC members! - George W6BUR, **CARC President**.

Public Service Announcements

HAM CRAM / HAM Licensing

For upcoming HAM Licensing locations please refer to:
http://www.arrl.org/find-an-amateur-radio-license-exam-session

Auxiliary Communications Service (ACS)

The Auxiliary Communications Service (ACS) is a unit of trained professionals who supply communications support to the agencies of the City and County of San Francisco, particularly during major events/incidents. ACS goals are the support of gathering and distribution of information necessary to respond to and recover from a disaster.

The ACS Net begins at 1930 hours (7:30 p.m. PT) local time each Thursday evening, on the WA6GG repeater at 442.050 MHz, positive offset, tone 127.3 Hz. The purpose of this net is to practice Net Control skills, practice checking in with deployment status in a formal net, and to share information regarding upcoming ACS events. Guests are welcome to check in. ACS members perform Net Control duty on a regular basis
On the second Thursday of each month, the net is conducted in simplex mode on the output frequency of the WA6GG repeater, 442.050 MHz no offset, tone 127.3 Hz.

ACS holds its General Meetings on the third Tuesday of each month from 1900 hours to 2100 hours local time. Currently meetings are exclusively conducted over Zoom during the COVID-19 pandemic, ACS looks forward to meeting in person again as soon as possible.

Upcoming meeting dates in 2022 are:

- TBD

Location of in person future ACS meetings is yet to be determined as the regular location is under reconstruction until January 2023. All interested persons are welcome to attend. For further information, contact Corey Siegel KJ6LDJ <kj6ldj@gmail.com>.

For more information, please attend an ACS meeting, check in on the ACS radio net, or call 415-558-2717.

Free Disaster Preparedness Classes In San Francisco – NERT Taught by San Francisco Fire Department (SFFD).

http://sf-fire.org/calendar-special-events

TBD

+ Recertifications - Coming Soon!

Pre-register here!

https://www.eventbrite.com/e/are-you-a-nert-graduate-looking-to-recertify-pre-register-here-tickets-228380330717?aff=odcleoeventsincollection

This is not for a specific date or location.

San Francisco Fire Department NERT is collecting information from NERT Graduates to help us plan for the new year. By signing up here, you will receive priority notification about upcoming recertification opportunities. This is for any NERT graduate, regardless of when you graduated or whether your NERT certification has expired. Thank you so much for your commitment to NERT and for providing us with information about when you last trained, etc.

Sign Up For Training Classes

This is not for a specific date or location.

San Francisco Fire Department is collecting contact details from prospective students so we can let you know when classes are available. We will email you when classes become available. We plan on holding multiple trainings for new NERTs in 2022 and the information you provide will help us plan. Thank you!

https://www.eventbrite.com/e/never-taken-nert-before-let-us-know-you-are-interested-in-2022-trainings-tickets-125825993935?aff=odcleoeventsincollection

***SFFD DOT** is the Fire Department Division of Training. All participants walking, biking or driving **enter through the driveway gate on 19th St.** between Folsom and Shotwell. Parking is allowed along the back toward the cinderblock wall.

Visit ***www.sfgov.org/sffdnert*** to learn more about the training, other locations, and register on line. Upcoming Special NERT Events.

San Francisco Police Department: Auxiliary Law Enforcement Response Team (ALERT)

The Auxiliary Law Enforcement Response Team (ALERT) is a citizen disaster preparedness program designed. The ALERT program is for volunteers 16 years of age or older, who live, work, or attend high school in San Francisco.

Graduates of the San Francisco Police Activities League (P.A.L) Law Enforcement Cadet Academy are also eligible to join.

ALERT volunteers will no longer need to complete the Fire Department's Neighborhood Emergency Response Team (NERT) (www.sfgov.org/sfnert) training and then graduate into two 8 hour Police Department course specifically designed for ALERT team members.

ALERT members will work closely with full-time and/or Reserve Police Officers in the event they are deployed after a disaster. The Basic ALERT volunteer will have no law enforcement powers other than those available to all citizens.

SFPD ALERT Training (New Members)

The next SFPD ALERT training class has been scheduled for: TBD

* Class date indicated are only for new members

IMPORTANT- All participants must complete the background interview process in order to be eligible to attend the ALERT training class.

Eligible ALERT participants may register for a training class by contacting the ALERT Program Coordinator, Marina Chacon at sfpdalert@sfgov.org, or by telephone at 415-401-4615.

SFPD ALERT Practice/Training Drill

All active/trained ALERT members are asked to join us for our next training drill, via scheduled for on

TBD

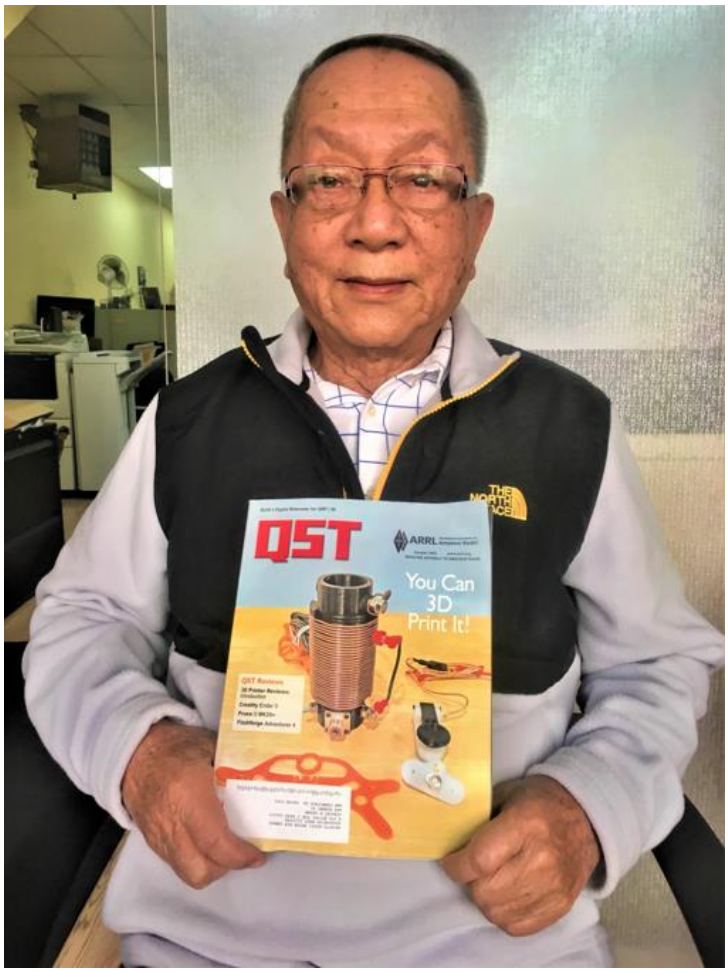
For more information on the San Francisco Police Department ALERT Program, email us at sfpdalert@sfgov.org, or call Lt. Marina Chacon (SFPD Ret.), SFPD ALERT Program Coordinator, at (415) 401-4615.

For additional information on the web please refer to:
https://sfgov.org/policecommission/alert

In the Spotlight Article

Tech Article:

Distinguished CARC member Vince Chinn (W6EE) – Featured In QST magazine.



Vince Chinn (W6EE) holding the October 2022 QST Magazine

In the October 2022 issue of QST, page 76-77, there is an article: “Northern California DX Foundation Golden Anniversary” by Bernie McClenny, W3UR.

The publication of the DX article was timed to commemorate the 50th anniversary of the Northern California DX Foundation which today is still going strong.

The DX article explains the contributions that our CARC member, Vince Chinn (W6EE) - CPA provided as one of the Northern California DX founding members.

Vince took time from his CPA business to handle the necessary preparation and filing of the paperwork to setup the Northern California DX foundation as a non-profit entity.

With permission from the QST, an excerpt from the QST DX article follows on the next page.

Although Vince is now semi-retired, his CPA business remains up and running full time, see link: http://www.vincechinncpa.com.

QST
ARRL The National Association for Amateur Radio
October 2022 www.arrl.org
DEVOTED ENTIRELY TO AMATEUR RADIO

Bernie McClenny, W3UR, w3ur@arrl.org

How's DX?

Northern California DX Foundation's Golden Anniversary

In October 1972, four amateurs met in an apartment above a Chinese restaurant in Chinatown, San Francisco. This is where Vince Chinn, K6KQN (now W6EE), had lived all his life. Vince thought there might be a few hams in the San Francisco Bay Area willing to contribute to an amateur radio foundation that supports DXpeditions and equips overseas amateurs. Also, at that meeting was Don Schliesser, W6MAV (later K6RV, now SK), John Troster, W6ISQ (SK), and Lee Shaklee, W6BH(SK).

Vince volunteered to draw up the papers and apply to the state of California and IRS. Thinking beyond San Francisco, they chose the name "Northern California DX Foundation (NCDXF)". They elected Shaklee to the first President, and he wrote a check for $1,000. Schliesser wrote a check for $100. Troster fished out a $10 bill, and Chinn dug around his pocket to find $1. The Northern California DX Foundation was started that night with $1,111. Some months later, Shaklee generously donated the seed capital in stock that still forms the principle investment.

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< Please refer to the actual October 2022 QST issue for the reminder of the article>

If you have questions about the Foundation or its work, please visit www.ncdxf.org.

Pages 76-77

Technical Article:

The best semiconductor of them all?

David L. Chandler | MIT News Office Jul. 21, 2022

https://meche.mit.edu/news-media/best-semiconductor-them-all

Silicon is one of the most abundant elements on Earth, and in its pure form the material has become the foundation of much of modern technology, from solar cells to computer chips. But silicon's properties as a semiconductor are far from ideal.

For one thing, although silicon lets electrons whizz through its structure easily, it is much less accommodating to "holes" — electrons' positively charged counterparts — and harnessing both is important for some kinds of chips. What's more, silicon is not very good at conducting heat, which is why overheating issues and expensive cooling systems are common in computers.

Now, a team of researchers at MIT, the University of Houston, and other institutions has carried out experiments showing that a material known as cubic boron arsenide overcomes both of these limitations. It provides high mobility to both electrons and holes, and has excellent thermal conductivity. It is, the researchers say, the best semiconductor material ever found, and maybe the best possible one.

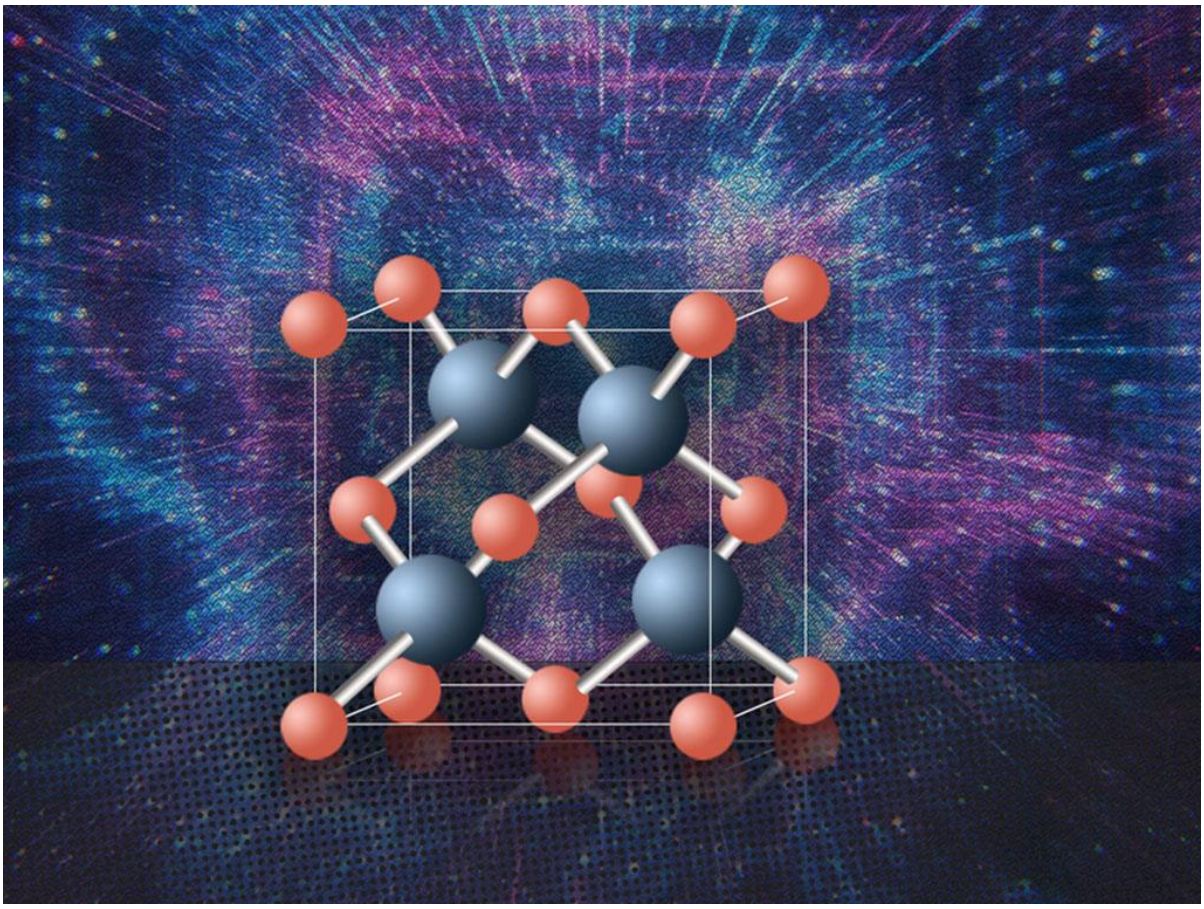
So far, cubic boron arsenide has only been made and tested in small, lab-scale batches that are not uniform. The researchers had to use special methods originally developed by former MIT postdoc Bai Song to test small regions within the material. More work will be needed to determine whether cubic boron arsenide can be made in a practical, economical form, much less replace the ubiquitous silicon. But even in the near future, the material could find some uses where its unique properties would make a significant difference, the researchers say.

The findings are reported today in the journal *Science*, in a paper by MIT postdoc Jungwoo Shin and MIT professor of mechanical engineering Gang Chen; Zhifeng Ren at the University of Houston; and 14 others at MIT, the University of Houston, the University of Texas at Austin, and Boston College.

Earlier research, including work by David Broido, who is a co-author of the new paper, had theoretically predicted that the material would have high thermal conductivity; subsequent work proved that prediction experimentally. This latest work completes the analysis by confirming experimentally a prediction made by Chen's group back in 2018:

that cubic boron arsenide would also have very high mobility for both electrons and holes, “which makes this material really unique,” says Chen.

The earlier experiments showed that the thermal conductivity of cubic boron arsenide is almost 10 times greater than that of silicon. “So, that is very attractive just for heat dissipation,” Chen says. They also showed that the material has a very good bandgap, a property that gives it great potential as a semiconductor material.



MIT researchers say cubic boron arsenide is the best semiconductor material ever found, and maybe the best possible one. Courtesy of Christine Daniloff, MIT

Now, the new work fills in the picture, showing that, with its high mobility for both electrons and holes, boron arsenide has all the main qualities needed for an ideal semiconductor. “That’s important because of course in semiconductors we have both positive and negative charges equivalently. So, if you build a device, you want to have a material where both electrons and holes travel with less resistance,” Chen says.

Silicon has good electron mobility but poor hole mobility, and other materials such as gallium arsenide, widely used for lasers, similarly have good mobility for electrons but not for holes.

“Heat is now a major bottleneck for many electronics,” says Shin, the paper’s lead author. “Silicon carbide is replacing silicon for power electronics in major EV industries including Tesla, since it has three times higher thermal conductivity than silicon despite its lower electrical mobilities. Imagine what boron arsenides can achieve, with 10 times higher thermal conductivity and much higher mobility than silicon. It can be a gamechanger.”

Shin adds, “The critical milestone that makes this discovery possible is advances in ultrafast laser grating systems at MIT,” initially developed by Song. Without that technique, he says, it would not have been possible to demonstrate the material’s high mobility for electrons and holes.

The electronic properties of cubic boron arsenide were initially predicted based on quantum mechanical density function calculations made by Chen’s group, he says, and those predictions have now been validated through experiments conducted at MIT, using optical detection methods on samples made by Ren and members of the team at the University of Houston.

Not only is the material’s thermal conductivity the best of any semiconductor, the researchers say, it has the third-best thermal conductivity of any material — next to diamond and isotopically enriched cubic boron nitride. “And now, we predicted the electron and hole quantum mechanical behavior, also from first principles, and that is also proven to be true,” Chen says.

“This is impressive, because I actually don’t know of any other material, other than graphene, that has all these properties,” he says. “And this is a bulk material that has these properties.”

The challenge now, he says, is to figure out practical ways of making this material in usable quantities. The current methods of making it produce very nonuniform material, so the team had to find ways to test just small local patches of the material that were uniform enough to provide reliable data. While they have demonstrated the great potential of this material, “whether or where it’s going to actually be used, we do not know,” Chen says.

“Silicon is the workhorse of the entire industry,” says Chen. “So, OK, we’ve got a material that’s better, but is it actually going to offset the industry? We don’t know.” While the material appears to be almost an ideal semiconductor, “whether it can actually get into a device and replace some of the current market, I think that still has yet to be proven.”

And while the thermal and electrical properties have been shown to be excellent, there are many other properties of a material that have yet to be tested, such as its long-term stability, Chen says. “To make devices, there are many other factors that we don’t know yet.”

He adds, “This potentially could be really important, and people haven’t really even paid attention to this material.” Now that boron arsenide’s desirable properties have become more clear, suggesting the material is “in many ways the best semiconductor,” he says, “maybe there will be more attention paid to this material.”

For commercial uses, Ren says, “one grand challenge would be how to produce and purify cubic boron arsenide as effectively as silicon. … Silicon took decades to win the crown, having purity of over 99.99999999 percent, or ‘10 nines’ for mass production today.”

For it to become practical on the market, Chen says, “it really requires more people to develop different ways to make better materials and characterize them.” Whether the necessary funding for such development will be available remains to be seen, he says.

The research was supported by the U.S. Office of Naval Research, and used facilities of MIT’s MRSEC Shared Experimental Facilities, supported by the National Science Foundation.