



May 2020

A Joint Publication of the Southern California and San Gorgonio Sections of the American Chemical Society

## Southern California Section

## Congratulations to the High School Chemistry Olympiad National Exam Team

See Page 3



Michael Morgan, Education Chair and 2020 Recipient of the James Bryant Conant Award in High School Chemistry Teaching

## San Gorgonio Section

Chair's Message—Ralph Riggin Congratulations to the High School Chemistry Olympiad National Exam Students

See Page 9



# In stock in Gardena, CA

SPECTRUM S120 2 Isopropyl Alcoh

## Spectrum has your lab covered

Chemicals

SPECTRUM

CPECTRUM

- Laboratory Equipment & Supplies
- Glassware & Plasticware

SPECTRUM

Gloves & More!



800.772.8786 SpectrumChemical.com



# **SCALACS**

## A Joint Publication of the Southern California and San Gorgonio Sections of the American Chemical Society

Volume LXXV

May 2020

Number 4

#### SOUTHERN CALIFORNIA SECTION 2020 OFFICERS

Chair: Brian Brady Chair Elect: Thomas Mathew Secretary/Treasurer: Barbara Belmont

**Councilors:** Brian Brady, Robert de Groot, Veronica Jaramillo, Virgil Lee, Eleanor Siebert, Barbara Sitzman

#### SAN GORGONIO SECTION 2020 OFFICERS

Chair: Ralph Riggin Chair-Elect: Jenifer Nalbandian Secretary: David Srulevitch Treasurer: Dennis Pederson Councilors: Eileen DiMauro, Ernie Simpson

## TABLE OF CONTENTS

So. Cal. Chair's Message	2
Index to Advertisers	
So. Cal. Information	
This Month in Chemical History	
Insights Into IP Law	
S. G. Chair's Message	
Chemists' Calendar	

Website address: www.scalacs.org

SCALACS (ISSN) 0044-7595 is published monthly March through May, September and October; and Bi-monthly January/February and November/December along with a special ballot issue once a year. Published by the Southern California Section of the American Chemical Society at 14934 South Figueroa Street, Gardena CA 90248. Subscription price is \$12.00/year. Make checks payable to Southern California Section, ACS. Second Class postage paid at Gardena, CA 90247, email: office@scalacs.org.

ADVERTISERS: Advertising rates on application. Mail COPY, CONTRACTS and CHECKS to Southern California Section, ACS, 14934 South Figueroa Street, Gardena, CA 90248.

CONTRIBUTORS: Send all copy to Editor, SCALACS, 14934 South Figueroa Street, Gardena, CA 90248, email: editor@scalacs.org.

POSTMASTER: Send change of address to SCALACS, 14934 South Figueroa Street, Gardena, CA 90248.

## **Chair's Message**



Welcome Southern California Section Members.

I hope you and your families are healthy and doing well. As the novel Corona virus quarantine has extended, we continue to cancel or postpone live events. In the past month we have begun to experiment with some virtual events for our

members. We had an **Earth Day e-Town Hall** Meeting on April 25. This was a joint meeting with AIAA. We also held our **High School Olympiad Exam** online as well (see Page 3). In addition, we are participating in the **National ACS Chemists Celebrate Earth Day digital Illustrated Poem Contest**. You can find all the details for the contest on our website, https://scalacs.org/?page\_id=29. The deadline for the Illustrated Poem Contest is May 3rd. We plan to continue virtual events into the summer.

Hopefully you have managed to participate in some virtual events. I would appreciate any feedback on events you have participated in, and any ideas you may have for future events.

Looking forward, we are planning the Tolman Award Dinner at the UCI University Club on September 16, 2020 to honor Prof. A. S. Borovik, the 2019 Richard C. Tolman Medal Recipient.

SCALACS is our vehicle for communicating with section members. Any plans for virtual events, or changes in the status of live events will be announced here, on our section website, www.scalacs.org, or via emails from our Section Office.

Thank you. Stay safe.

Brian Brady, Chair



## 2020 High School Chemistry Olympiad

Because of the coronavirus, schools closed about the time we would normally give the local section High School Olympiad Exam. National ACS, as well as our section, developed the test on-line. Even with the virus, we had **730 students from 33 schools** take the local section test. The top students from the local exam were invited to participate in Part I of the online National Exam on April 26. The top 150 students from the Part I test were then invited to participate in Part II of the National Exam on May 3. **We had 7 students qualify for Part II.** Their names are annotated with an asterisk below. The top scorers from the National Exam will go to a virtual study camp to be online in June. The International Olympiad will probably be an online event also.

### Congratulations to our National ACS Exam Team for 2020:

*Gordon He Guo	Arcadia High School
*Alex Dang	Arcadia High School
Tyler Weigand	Harvard-Westlake
Aaron Zhao	Harvard-Westlake
*Phillip Jeong	Los Angeles Center for Enriched Studies
Sameer Nayyar	Loyola High School
Matthew Kim	Loyola High School
Theodore Dupont	North Hollywood High School
*Albert Zhang	North Hollywood High School
*Akash Anand	Palos Verdes Peninsula High School
Jia Hu	San Marino High School
*Sunjae Kim	West Torrance High School
*Randall Scharpf	West Torrance High School
Kenneth Nguyen	Whitney High School
Harry Yaun	Whitney High School

### **INDEX TO ADVERTISERS**

American Research & Testing\_\_\_\_\_2Spectrum Chemical\_\_\_\_\_\_ifc

Our Advertisers support our Section. Please let them know that you saw their ad in SCALACS!

#### All About Masks – the First Line of Defense against COVID-19 Krishna Kallury, Ph.D.

With cases of COVID-19 growing rapidly in the US and evidence mounting that the virus responsible, SARS-CoV-2, can be spread by infected people before they develop symptoms, the US Centers for Disease Control and Prevention recommended April 3 that people wear cloth face coverings in public places. "Members of the general public should wear non-medical fabric face masks when going out in public in one additional societal effort to slow the spread of the virus down," Tom Inglesby, Director of the Johns Hopkins Center for Health Security, tweeted March 29.

These experts hope the measure will reduce the rate of disease transmission by adding a layer of protection in places where social distancing is difficult, such as grocery stores, while reserving limited supplies of medical-grade protective equipment for health-care workers.

Understanding what masks must do to protect wearers and those around them begins with understanding how SARSCoV-2 spreads. Experts think people pass the virus to others primarily through respiratory droplets. These infectious globs of saliva and mucus, expelled by talking and coughing, are relatively large and travel limited distances—they tend to settle on the ground and other surfaces within 1–2 m, although at least one study has suggested sneezing and coughing can propel them farther. Scientists have not yet reached a consensus on whether SARS-CoV-2 can also spread through smaller aerosols, which have the potential to spread farther and linger in the air. In one experiment, researchers found that the virus can remain infectious in aerosols for 3 h in controlled lab conditions. But this study has limitations. As the World Health Organization notes, the researchers used specialized equipment to generate the aerosols, which "does not reflect normal human cough conditions."

Homemade and other nonmedical cloth masks would function like surgical masks, which are designed to minimize the spread of germs by blocking the wearer's respiratory emissions. Those include saliva and mucus droplets, as well as aerosols. These masks, often made of nonwoven materials like paper, fit loosely around the face and allow air to leak in around the edges when the user inhales. As a result, they're not considered reliable protection against inhaling the virus. In contrast, tightly fitting N95 masks are designed to protect the wearer by trapping incoming infectious particles in complex layers of extremely fine polypropylene fibers. These fibers are also electrostatically charged to provide extra "stickiness" while retaining breathability. N95 masks, which if used correctly can filter at least 95% of small airborne particles, are critical for the safety of health-care workers who are regularly encountering infected people. *(Continued on Page 5)* 

## **Southern California Section**

#### Masks (Continued from Page 4)

Smart Air, a social enterprise and certified B-Corp that promotes cost-effective, data-backed air filters as a solution to indoor particulate air pollution, has released the results of their latest research on DIY face mask materials, in which they tested over 30 different materials — including bra pads, coffee filters, pillow cases, electrostatic cloths, cotton T-shirts, wool, bed sheets, polyester, bandanas and more — for their effectiveness in filtering coronavirus -sized microparticles, as well as their breathability. Both those factors are vital, because while some materials may test high for filtration, they test low for breathability — a mask you can't actually breathe in isn't exactly helpful to anyone. Among the key takeaways: scarves tested among the least effective materials, while denim, canvas and paper towels were among the best.

Smart Air aimed to mimic the test setup used by Cambridge University researchers, known as a Henderson apparatus, in which a fan blows air and particles through the mask material. The materials were tested for their ability to filter large-sized (1 micron, similar to the size of the Ebola virus) and small-sized (0.3 micron, the size of the smallpox virus) particles and for their breathability factor. For reference, COVID-19 coronavirus particles measure 0.06-0.14 microns in size, but 5-10 microns when in droplets.



The version of the Henderson apparatus used by Smart Air in this study. (Photo: Smart Air)

Suggested further reading references: Chemical & Engineering News 2020, April 13 issue Kristen Aiken, Huff Post Life, April 21, 2020



## This Month in Chemical History Harold Goldwhite, California State University, Los Angeles hgoldwh@calstatela.edu

My esteemed colleague Emeritus Professor of Chemistry Costello Brown, whose experiences as a graduate student were reported in a previous column, has been cleaning out his garage and came across another item that has considerable interest for the history of chemistry. It is a reprint of an article from "American Scientist" – the Winter Issue of 1948 - entitled "Chemical Achievement and Hope for the Future" by Linus Pauling of the California Institute of Technology. The article is prefaced by a splendid photograph of Pauling at the chalkboard discussing the "activated complex" in a reaction apparently involving gamma-globulin.

Now for the history. The article is based on a Sillman Lecture, delivered at Yale University, on the hundredth anniversary of the founding of the Sheffield Scientific School. In opening remarks Pauling gives his opinion that those hundred years "... have witnessed the nearly complete transition of chemistry from an essentially empirical and descriptive science to a largely exact and theoretical one." To illustrate: "...in 1847 the correct atomic weights of the elements had not been generally accepted, so that the formula of water was still written as HO by many chemists". Pauling touches on a number of outstanding landmarks in the decades following 1847. The concept of valence was advanced by Frankland in the early 1850s. The idea that molecules could be represented by structural formulas was introduced by Couper and independently by Kekule in 1858.

Turning to thermodynamics, a field of chemistry to which Yale made foundational contributions, in 1847 Josiah Willard Gibbs was only 8 years just established experimentally the first law of old. Ioule had thermodynamics, by determining the mechanical equivalence of heat energy. Rather surprisingly the second law of thermodynamics pre-dates the first law by several decades. In 1824 the young engineer Sadi Carnot gave the first statement of what was later recognized as the second law. In the early 1850s William Thomson (Lord Kelvin) and independently Rudolf Clausius combined first and second laws to begin the application of thermodynamics to chemical systems. The flowering of this approach came with the publication by Willard Gibbs of Yale of his comprehensive treatises first of chemical thermodynamics in the 1870s, and later of his (Continued on Page 7)

## This Month in Chemical History (Continued from Page 6)

invention of statistical mechanics. Chemical thermodynamics reached essentially its current form in the early  $20^{th}$  century with the statement by Nernst of the third law.

By 1947 when the Pauling lecture was given, it was possible to predict, from a knowledge of the thermodynamic properties of a set of reagents, the equilibrium composition of a reaction in which they were involved. But: "... there still remains, however, one most important question to which a definite answer cannot in general be given. This is the question as to the rate at which the reaction will take place under given circumstances." Chemical kinetics is still in its infancy.

Pauling makes an interesting observation, in his exploration of thermodynamics, of attempts to reach increasingly low temperatures. Following James Dewar in the early 20<sup>th</sup> century the Dutch scientist Kammerlingh Onnes reached a temperature of 0.71 K in work on liquid helium. Subsequently the chemist William Giauque invented the novel technique of adiabatic demagnetization that led to the production of temperatures as low as 0.001 K.

In the area of the chemical elements the years just prior to 1947 have led to striking developments of the periodic table. These were alluded to in a companion lecture to Pauling's given by E.O. Lawrence of U.C. Berkeley. Four transuranium elements have now been synthesized by what Pauling refers to as modern alchemy. They are neptunium; plutonium; americium; and curium. "We may look forward with confidence to the announcement that still more new elements have been made..." (About 20 more at the time of my column).

The article closes with speculations about the relations among chemistry, biology, and medicine, an area that became of increasing interest to Pauling in the later stages of his career. You may recall the interest raised by Pauling in his advocacy of mega-doses of Vitamin C to treat the common cold. At this stage he is probing the nature of the catalytic activities of enzymes and exactly how they work.

I enjoyed reading Pauling's address and the light it shone on the century before 1947 in chemical history. Let me urge my readers to clean out their garages, and send me any nuggets they unearth that relate to the history of chemistry.



# Insights Into IP Law Keith Orso\*, Irell & Manella LLP

KOrso@irell.com

The March 2020 edition of this column described a case involving a drug company that developed an anticoagulant formulation. Because the company did not have its own manufacturing facilities, it paid another entity to manufacture three batches of the drug for commercial use. The cost was more than \$100,000 per batch. The question in the case was whether this activity, which took place more than one year before the company filed a patent application on the drug product, created an "on-sale bar" that invalidated the resulting patent claims.

In the United States, courts may invalidate patent claims under the "on-sale bar" doctrine when an inventor commercially exploits his or her invention for more than a year before filing a corresponding patent application.

Here, the trial court ruled that the on-sale bar doctrine did not apply. The court of appeal ultimately affirmed, stating that where a patent claims a product, the performance of an unclaimed process of creating the product, without an accompanying "commercial sale" of the product itself, does not trigger the onsale bar.

The appellate court found significant the fact that the activities in question were invoiced as manufacturing services and that legal title to the product of those manufacturing services remained with the patent applicant. Accordingly, the manufacturer was not free to use or sell the claimed products or to deliver the claimed products to anyone other than the patent applicant. In essence, the manufacturer acted simply as a pair of laboratory hands to make the product. The party arguing for application of the on-sale bar pointed out that passage of title is not determinative because an inventor could commercially exploit an invention by charging others a fee to use it without transferring title. The court of appeal responded that in that situation, the invention would likely still be considered "on-sale" because use of the invention itself would be on sale for a price.

The court of appeal found that the confidential nature of the transactions in the case also weighed against a conclusion that the transactions were commercial in nature such that the on-sale bar should apply. And it found that the mere stockpiling of a patented invention by a purchaser of manufacturing services does not constitute a "commercial sale" that triggers the bar. Not every activity that inures some commercial benefit to the inventor can be considered a "commercial sale," the court wrote.

\* The author earned engineering and chemical engineering undergraduate and graduate degrees, and is a patent attorney and partner at the law firm of Irell & Manella LLP. This column does not constitute legal advice and does not necessarily reflect the views of the firm or its clients.

## San Gorgonio Section



#### **Chair's Message**

Hopefully you all are doing well in this challenging time, and maybe by the time this message appears in print the near term rules regarding reopening "normal life" will be more clearly defined. Needless to say these are challenging and uncertain times.

Thanks to the efforts of two of the Section's Officers, Eileen DiMauro and Dennis Pederson, the San Gorgonio Section partnered with local high schools to participate in the Digital Chemistry Olympiad on Sunday, April 19<sup>th</sup> and the top scoring students were invited to participate in the National Exam, Part 1 on Sunday April 26<sup>th</sup>. Team members are listed below. Due to current physical distancing requirements, there was no laboratory portion on the National exam.

The San Gorgonio Section expects to develop a tentative revised event schedule, taking into consideration ongoing restrictions on social gatherings, for the remainder of the year and the information will be posted on the section website in approximately late May.

A quick reminder that you can access the local section information on the websites shown below:

---ACS San Gorgonio Local Section website: http://www.sgacs.org

---ACS San Gorgonio Local Section Instagram:

https://www.instagram.com/sangorgonioacs/

As always I welcome any suggestions, comments, etc. from members of the section or other interested parties. My email is: rm.riggin@yahoo.com. Feel free to contact me at any time.

Ralph Riggin, Chair

#### Congratulations to San Gorgonio National Olympiad Team Members And Part II Finalists (indicated with asterisk)

Student	High School
Hamlin Wu	Diamond Bar
*Luke F. Zhou	Diamond Bar
Eduardo Yanez	Eitwanda
Aditya Desai	Martin Luther King
*Gary Song	Martin Luther King
Chad Michael Coen	Redlands East Valley
Kelly Nguyen	Walnut
Kangning Song	Walnut
William Li	Webb Schools
Junseo Park	Webb Schools
Arnauld Martinez	Western Center Academy

May 2020

SOUTHERN CALIFORNIA SECTION AMERICAN CHEMICAL SOCIETY 14934 S. FIGUEROA STREET GARDENA, CA 90248

## IMPORTANT Do Not Delay!

**Contains Dated Meeting Announcement** 

# PERIODICAL

## **Bi-Section Chemists' Calendar**

For more information on these events, please check our website at www.scalacs.org

### <u>May</u>

- 3 National High School Olympiad Part II Exam—see page 3 and 9
- 3 ACS CCEW digital Illustrated Poem Contest deadline—see page 2

### **September**

16 SC Tolman Award Dinner at UCI University Club honoring Prof. A. S. Borovik, UCI—see Page 2

To find out which events have been cancelled or postponed, or find virtual events, please see our websites: www.scalacs.org www.sgacs.org