How to Push Your Research to Top Notch Ranking

อิทธิพล จีระพันธ์

Itthipon Jeerapan, Ph.D.

Assistant Professor
Division of Physical Science, Faculty of Science, Prince of Songkla University, Thailand
itthipon.j@psu.ac.th

Jun 21, 2024

Preparation Course for New International Students Academic Year 2024

Know Me - Itthipon Jeerapan (since 1991)

- **Current Position:** Assistant Professor in Analytical Chemistry
- **Affiliation:** Division of Physical Science, Prince of Songkla University, Thailand

- **Editorial Role:** Associate Editor of *ECS Sensors Plus* (by the Electrochemical Society), Guest Editors for many international journals (WoS/Scopus).
- **Reviewer:** such as *Advanced Materials, Nature Communications*, *Biosensors and Bioelectronics*, *ACS Sensors*, *ACS Nano*, *Microchimica Acta*, *Electrochemistry Communications*, etc.
- **Publications: …..**

Electrochemistry for all

Know You???

Itthipon Jeerapan

Other names ▸

Faculty of Science, Prince of Songkla University
Verified email at ucsd.edu - Homepage

Electrochemistry Biosensors Chemical Sensors Materials Energy

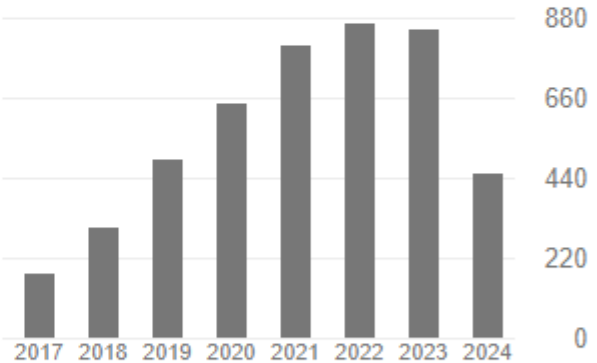
FOLLOW

GET MY OWN PROFILE

TITLE	CITED BY	YEAR
Wearable chemical sensors: Present challenges and future prospects AJ Bandodkar, I Jeerapan, J Wang ACS Sensors 1 (5), 464-482	703	2016
Noninvasive Alcohol Monitoring Using a Wearable Tattoo-Based Iontophoretic-Biosensing System J Kim, I Jeerapan, S Imani, TN Cho, A Bandodkar, S Cinti, PP Mercier, ... ACS Sensors 1 (8), 1011-1019	577	2016
A stretchable and screen-printed electrochemical sensor for glucose determination in human perspiration A Abellán-Llobregat, I Jeerapan, A Bandodkar, L Vidal, A Canals, J Wang, ... Biosensors and Bioelectronics 91, 885-891	315	2017
Highly Stretchable Fully-Printed CNT-Based Electrochemical Sensors and Biofuel Cells: Combining Intrinsic and Design-Induced Stretchability AJ Bandodkar, I Jeerapan, JM You, R Nuñez-Flores, J Wang Nano letters 16 (1), 721-727	310	2015
Stretchable biofuel cells as wearable textile-based self-powered sensors I Jeerapan, JR Sempionatto, A Pavinatto, JM You, J Wang Journal of Materials Chemistry A 4 (47), 18342-18353	306	2016

Cited by

	All	Since 2019
Citations	4652	4122
h-index	27	27
i10-index	42	41



Public access VIEW ALL

7 articles not available

15 articles available

As of May 2024

ELECTROCHEMISTRY FOR ALL *Beyond Electrochem!*

Itthipon Jeerapan, Ph.D.

itthipon.j@psu.ac.th

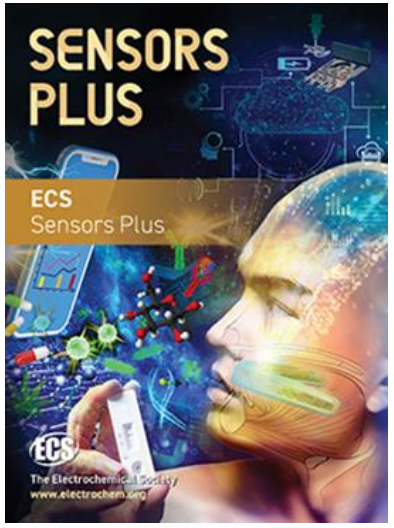
Education: *University of California San Diego (Ph.D. and M.S. in Nanoengineering); Prince of Songkla (B.Sc. First Class Honor in Chemistry)*

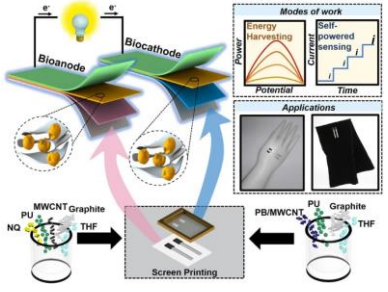
TOP 2% Scientists in the World in Analytical Chemistry "เคมีวิเคราะห์" Materials "วัสดุ" Enabling & Strategic Technologies "การพัฒนาและใช้งานเทคโนโลยีเชิงกลยุทธ"

Our Representative Work in Top Journals

Nano-Micro Letters, Advanced Functional Materials, Nature Communications, Analytical Chemistry, Chemical Engineering Journal; ACS Sensors, Biosensors and Bioelectronics, Accounts of Chemical Research, Energy & Environmental Science, Journal of Materials Chemistry A, B, and C, Microchimica Acta, Journal of the Electrochemical Society, Advanced Healthcare Materials, Electrochimica Acta, Small, Nano Letters, etc.

With over 190 Co-Authors All around the World





Publications >60, citations over 4500 times, H Index of 27.

- **"Electrochemistry for all"** - where possibilities are limitless and innovation knows no bounds!
- Delving into the fascinating world of electrochemical wonders.
- Sensor and energy device innovation.
- Leveraging cutting-edge materials and nanotechnology.
- Creating applications in biomedical devices, healthcare, pharmaceuticals, environment, and food industries.
- Exploring green and sustainable approaches.
- Powering the future with miniaturized technology.

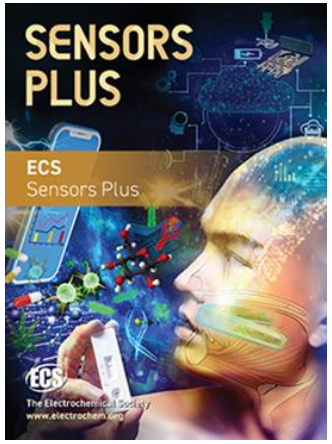
Let's Make Joint Success with Us!!!

Know Me - Itthipon Jeerapan (since 1991)

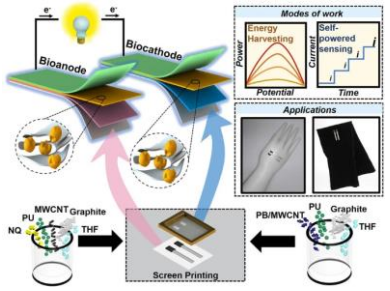
Our Representative Work

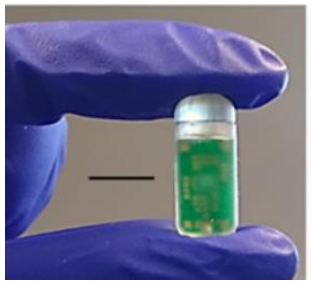
Nano-Micro Letters, Advanced Functional Materials, Nature Communications, Chemical Engineering Journal, Analytical Chemistry, ACS Sensors, Biosensors and Bioelectronics, Accounts of Chemical Research, Energy & Environmental Science, Journal of Materials Chemistry A, B, and C, Microchimica Acta, Journal of the Electrochemical Society, Advanced Healthcare Materials, Electrochimica Acta, Small, Nano Letters, etc.

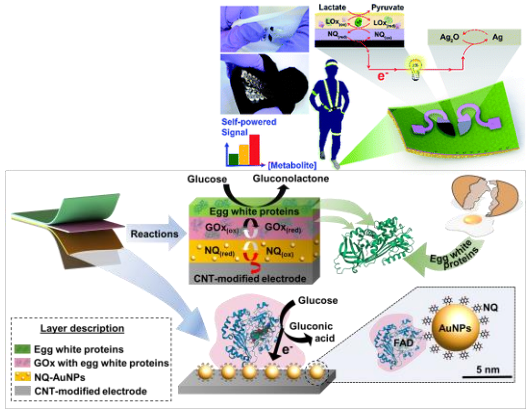
With over 190 Co-Authors All around the World



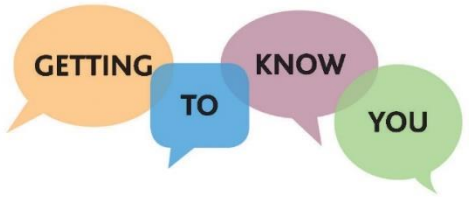
Electrochemical Sensors; Electrochemical **Energy** Devices (**Biofuel Cells**/**Supercapacitors**); Nanomaterials and Advanced Functional **Materials**; **Biomedical** and **Miniaturized Devices**, Biosensors, and Bioelectronics (**Wearable/Ingestible/Implantable Tech**); **Transdermal Drug Delivery**. Applications: Personalized Biomedicine, Sensing in **Pharmaceuticals**, **Environment**, and **Food**.







Know You???



Know You???
[Discussion Point]

Have you encountered challenges, problems, or success in your own research endeavors?

ท่านเคยประสบกับความท้าทาย ปัญหา หรือความสำเร็จในการวิจัยของท่านเองหรือไม่.....

How to Push Your Research to Top Notch Ranking???

How to Push Your Research to Top Notch Ranking???

1. High-Quality Research:

- Originality and Innovation; Robust Methodology; Comprehensive Literature Review

2. Writing and Presentation:

- Clear and Concise Writing; Strong Abstract and Keywords; High-Quality Figures and Tables

3. Publication Strategy:

- Choosing the Right Journal; Understanding Journal Requirements; Peer Review Process

4. Collaboration and Networking:

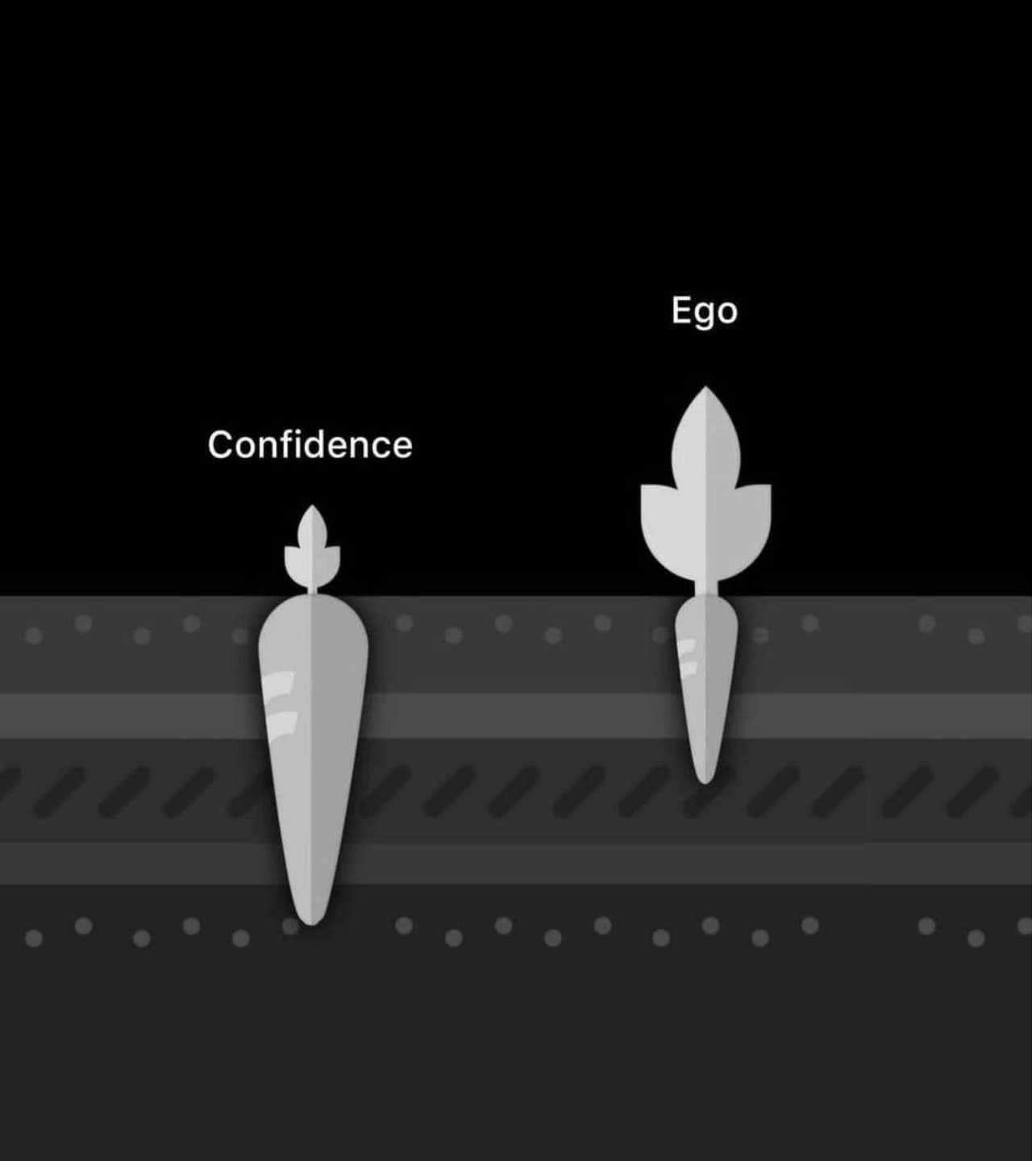
- Collaborate with Other Researchers; Build a Professional Network; Visibility and Dissemination; Use of Social Media and Online Platforms; Public Engagement

6. Metrics and Impact:

- Citation Metrics; Research Impact

7. Continuous Improvement:

- Seek Feedback; Professional Development; Growth Mindset



Active Learning

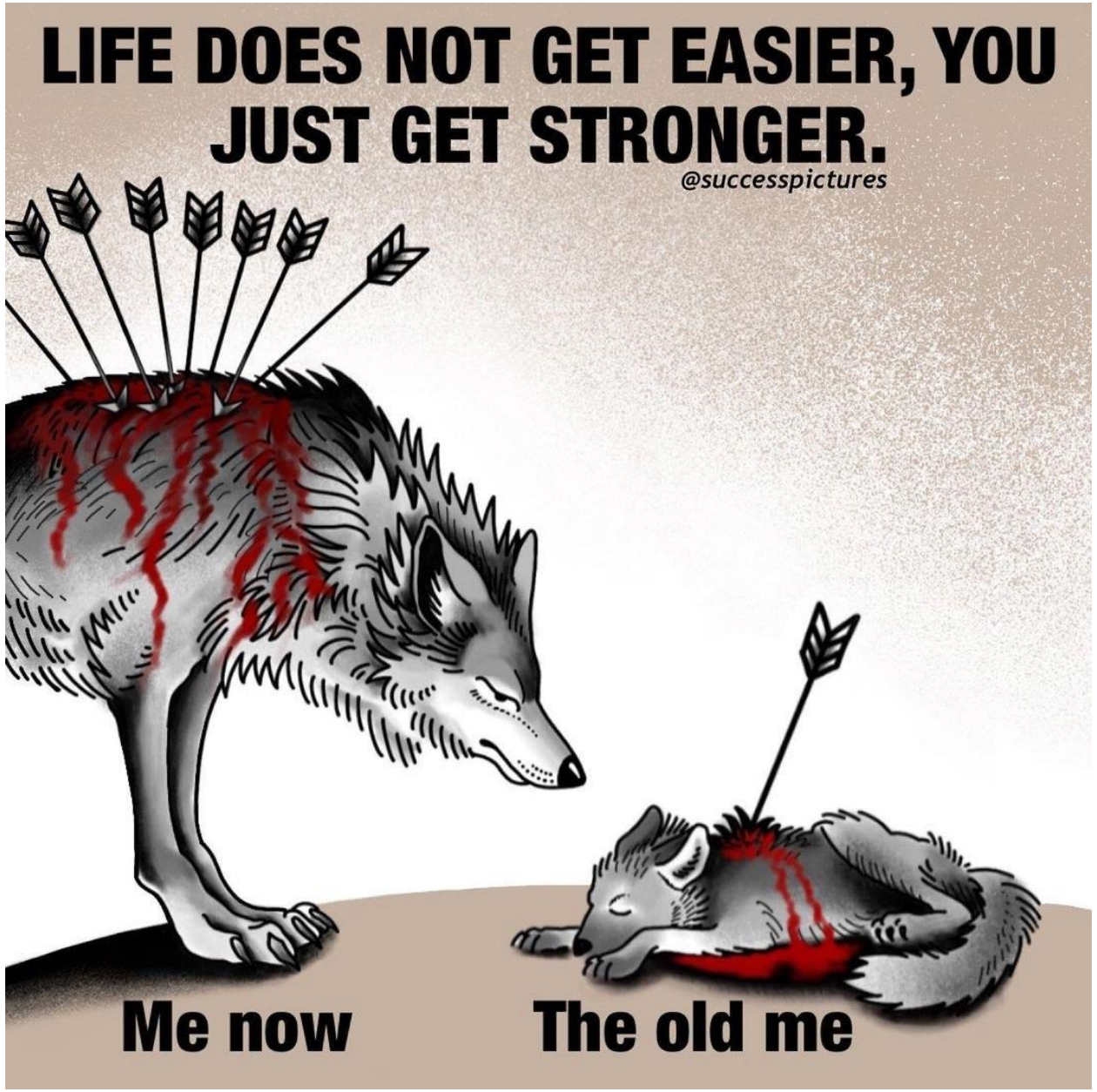
Feel free to ask questions at any point!

The Power of Passion and Curiosity

- **Find Your Niche:**
- Identify specific areas of interest within your field that excite and motivate you.
- **Set Clear Goals:**
- Establish both short-term and long-term objectives to maintain focus and direction.
- **Embrace Challenges:**
- View obstacles as opportunities to learn and grow rather than setbacks.
- **Stay Curious:**
- Continuously seek new knowledge and perspectives to fuel your passion and creativity.
- **Network with Peers:**
- Engage with other passionate researchers to exchange ideas and gain inspiration.
- **Balance Passion with Practicality:**
- While passion is crucial, also consider feasibility and practicality in your research endeavors.

"The power of passion and curiosity fuels the engine of innovation, driving us to explore the unknown and achieve the extraordinary."

EXPERIENCING PAPER REJECTION


LIFE DOES NOT GET EASIER, YOU JUST GET STRONGER.
@successpictures
Me now
The old me

[Discussion Point]

Rejection!

Hans Krebs' paper on the citric acid cycle, AKA the **Krebs cycle**, 1937

Rejection letter from Nature to Hans Krebs.

Telegraphic Address:
PHUSIS, LESQUARE, LONDON
Telephone Number:
WHITEHALL 8831

NATURE

Editorial and Publishing Offices:
MACMILLAN & CO., LTD.,
ST. MARTIN'S STREET,
LONDON, W.C.2.

RAG.AH/N. 14th June 1937.

The Editor of NATURE presents his compliments to Mr. H. A. Krebs and regrets that as he has already sufficient letters to fill the correspondence columns of NATURE for seven or eight weeks, it is undesirable to accept further letters at the present time on account of the delay which must occur in their publication.

If Mr. Krebs does not mind such delay, the Editor is prepared to keep the letter until the congestion is relieved in the hope of making use of it. He returns it now, however, in case Mr. Krebs prefers to submit it for early publication to another periodical.

The invention of **the radioimmunoassay**, 1955

September 29, 1955

Dr. Solomon A. Berson
Radioisotope Service
Veterans Administration Hospital
130 West Kingsbridge Road
Bronx 63, New York

Dear Dr. Berson:

I regret that the revision of your paper entitled "Insulin-I^{131} Metabolism in Human Subjects: Demonstration of Insulin Transporting Antibody in the Circulation of Insulin Treated Subjects" is not acceptable for publication in THE JOURNAL OF CLINICAL INVESTIGATION. - - - - - - - - - - - -

- - - - - - - - - - - - - - The second major criticism relates to the dogmatic conclusions set forth which are not warranted by the data. The experts in this field have been particularly emphatic in rejecting your positive statement that the "conclusion that the globulin responsible for insulin binding is an acquired antibody appears to be inescapable". They believe that you have not demonstrated an antigen-antibody reaction on the basis of adequate criteria, nor that you have definitely proved that a globulin is responsible for insulin binding, nor that insulin is an antigen. The data you present are indeed suggestive but any more positive cleaim seems unjustifiable at present.

- -

Sincerely,

Stanley E. Bradley

Stanley E. Bradley, M.D.
Editor-in-Chief

From 'Journal of Clinical Investigation'

Years after **winning the Nobel Prize in Physiology and Medicine in 1977**, Rosalyn Yalow would show this rejection letter around proudly.

now radioimmunoassay is a common technique used for determining antibody levels in the body - it works by releasing an antigen tagged with a radioisotope and tracking it around the body.

JOURNAL OF CLINICAL INVESTIGATION

Journal Impact Factor ™

2020	Five Year
14.808	16.792

JCR Category	Category Rank	Category Quartile
MEDICINE, RESEARCH & EXPERIMENTAL *in SCIE edition*	3/140	Q1

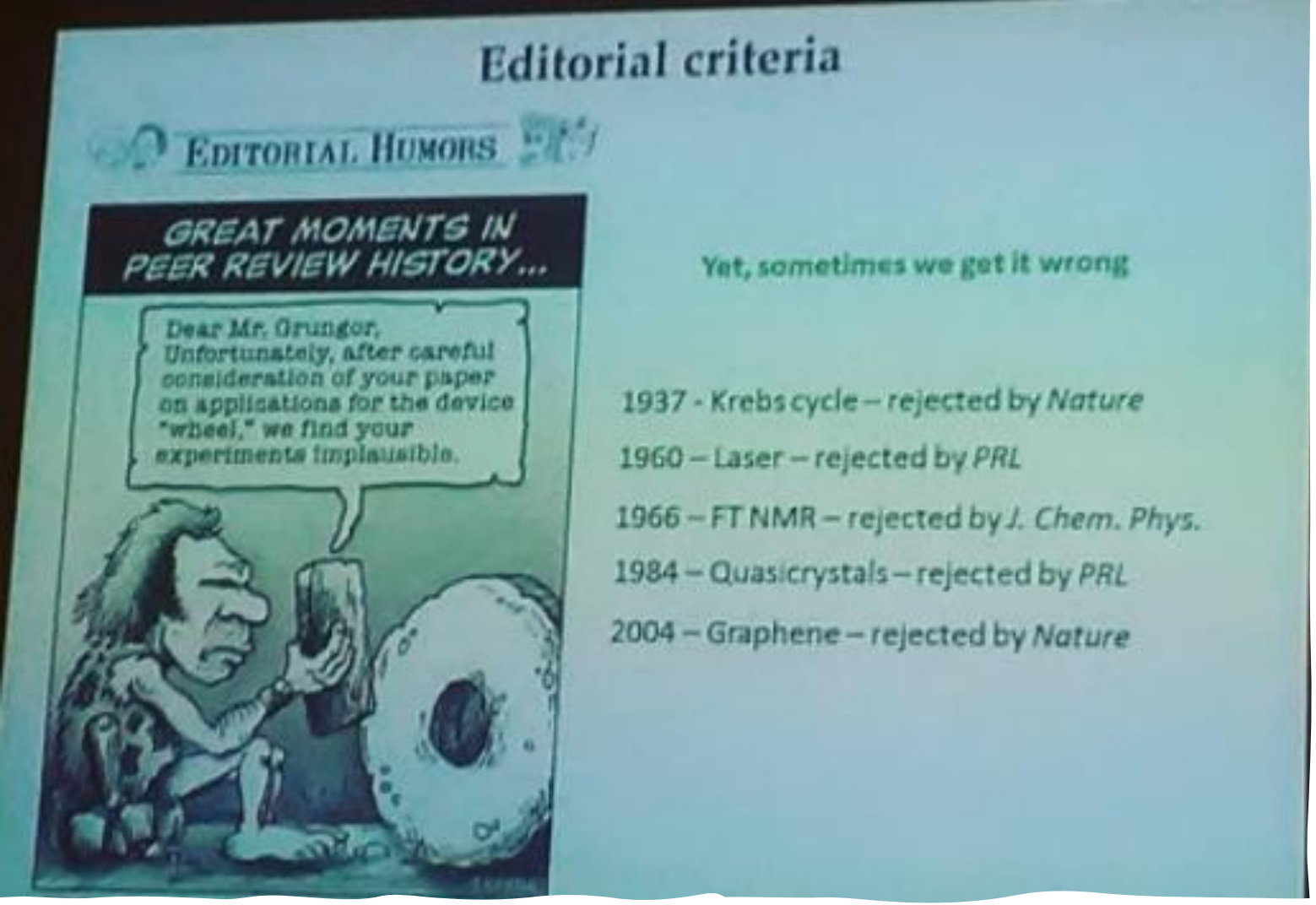
Source: Journal Citation Reports ™ 2020

The first paper on **polymerase chain reaction (PCR)**, 1993

"Dan Koshland would be the editor of Science when my first PCR paper was rejected from that journal and also the editor when PCR was three years later proclaimed Molecule of the Year." - Kary Mullis, Nobel Prize

Kary Mullis was jointly awarded the 1993 Nobel Prize in Chemistry for "his invention of the polymerase chain reaction (PCR) method".

PCR is the technique that is used every day in labs across the world to amplify DNA strands - but THE FIRST PAPER DESCRIBING IT WAS **REJECTED BY SCIENCE**. No word as yet on why, but we bet the journal was pretty sore to miss out on that scoop.

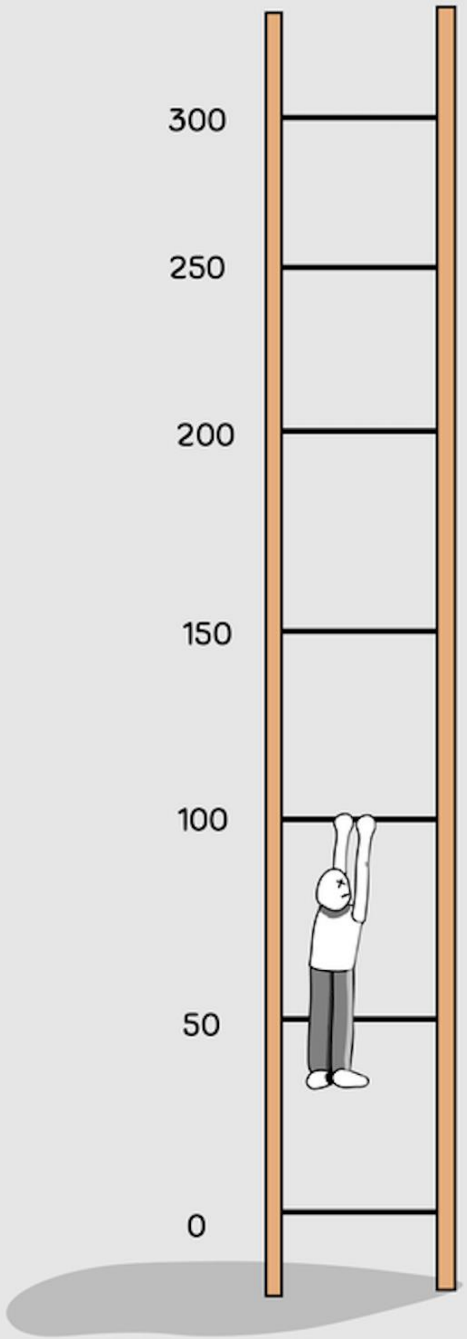


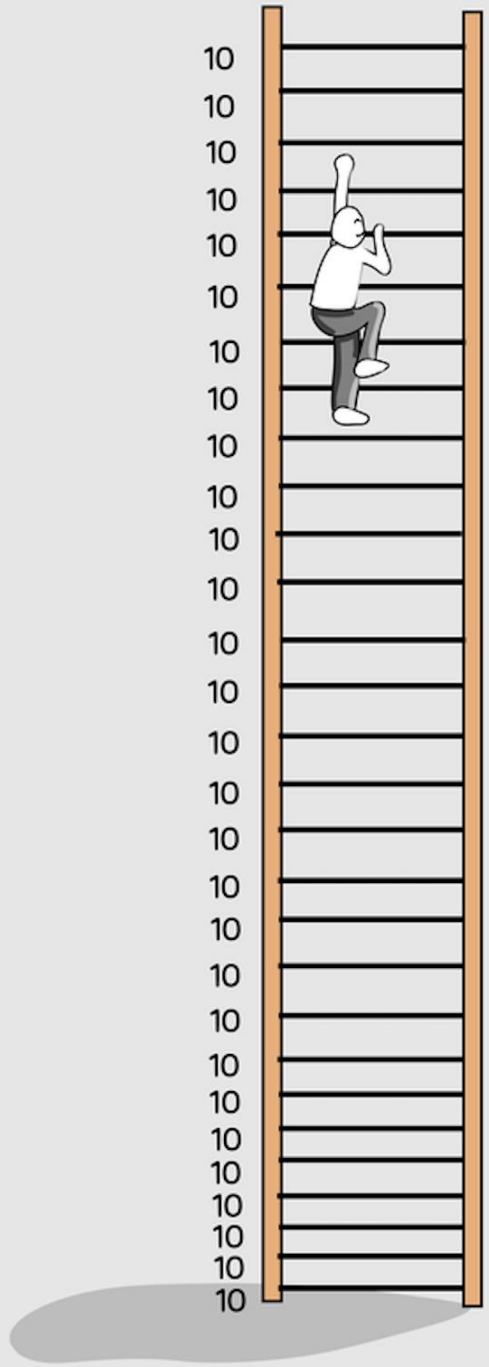
- A seminar from an editor (Nature Nanotechnology) 20190301 Taken by Itthipon J.

- *REF: https://www.instagram.com/the.itthipium/*

Dream!
Set Goals.

Take Actions!





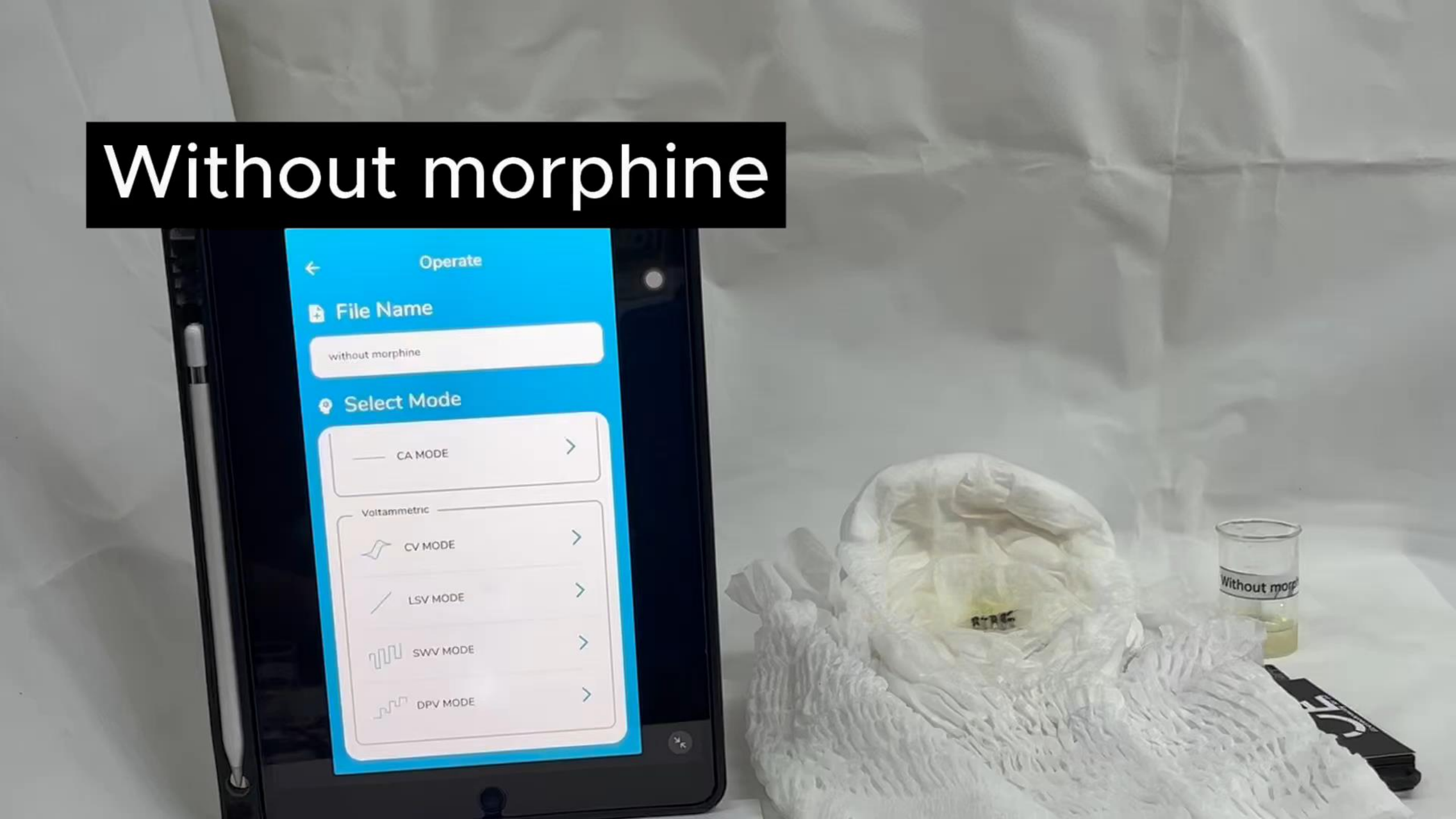
Goals for Research

Specific,
Measurable,
Achievable,
Relevant, Time-bound

Challenges Faced by Young Researchers

- Personal experiences and challenges faced while establishing my own lab.
- The limitations of limited seed funds and the need to seek collaborations and research grants.

Without morphine



Microchimica Acta (2021) 188: 415
https://doi.org/10.1007/s00604-021-05067-7

ORIGINAL PAPER

Cavitas electrochemical sensors for the direct determination of salivary thiocyanate levels

Rachanon Sangsawang[1] · Chongdee Buranachai[1,2,3] · Panote Thavarungkul[1,2,3] · Proespichaya Kanatharana[1,2,3] · Itthipon Jeerapan[1,2,3]

Received: 1 August 2021 / Accepted: 20 October 2021 / Published online: 9 November 2021

2021
(2564)

Abstract
Noninvasive diagnosis using salivary samples to detect thiocyanate provides vital information on individual health. This article demonstrates the first example of a wearable sensing device to noninvasively assess thiocyanate levels. The customized screen-printed electrode system is integrated into a form of a mouthguard squarewave-voltammetric sensor toward the convenient and fast detection of the salivary biomarker within 15 s. The sensor with a protective film to mitigate the effect of biofouling offers high sensitivity and selectivity toward the detection of thiocyanate ions. Partial least square regression is applied to analyze the high-order squarewave-voltammetric data over the applied potential range of 0–1.75 V vs Ag/AgCl and quantify the thiocyanate concentration in a complex matrix. The mouthguard sensor operating under physiological conditions can monitor a wide range of thiocyanate (up to 11 mM) with a low detection limit of 30 µM. The demonstration introduces a unique approach, that obviates the requirement for blood sampling, to study thiocyanate levels of healthy people, cigarette smokers, or people with other health conditions. It is envisioned that the new *cavitas* device possesses a substantial promise for diverse biomedical diagnosis applications.

Keywords Wearable sensors · Thiocyanate · Saliva · Smokers · Screen-printed sensors; Squarewave voltammetry

Acknowledgements We would like to thank to Talent Management Project of Prince of Songkla University. We also gratefully acknowledge the Center of Excellence for Innovation in Chemistry (PERCH-CIC), Ministry of Higher Education, Science, Research, and Innovation (MHESI).

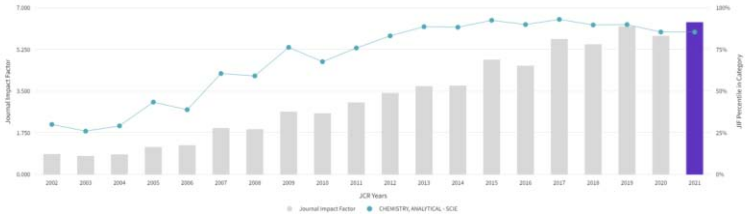
Funding This project was supported by the Faculty of Science Research Fund 2021 (Contract Number: 264003), Prince of Songkla University, Hat Yai, Thailand.

Declarations

Conflict of interest The authors declare no competing interests.

2021 JOURNAL IMPACT FACTOR

6.408



EDITION
Science Citation Index Expanded (SCIE)

CATEGORY
CHEMISTRY, ANALYTICAL
13/87

JCR YEAR	JIF RANK	QUARTILE	JIF PERCENTILE
2021	13/87	Q1	85.63

Source title	CiteScore	Highest percentile
Microchimica Acta	11.3	89% 15/141 Analytical Chemistry

Challenges Faced by Young Researchers

- Personal experiences and challenges faced while establishing my own lab.
- The limitations of limited seed funds and the need to seek collaborations and research grants.

Luck!

Challenges Faced by Young Researchers

- Personal experiences and challenges faced while establishing my own lab.
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Challenges Faced by Young Researchers

- Personal experiences and challenges faced while establishing my own lab.
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Energy! Idea!

Building a Solid Foundation

“Knowledge is not power, but potential. Applying that knowledge is power.”

Seeking Collaborations and Research Funds

- Tips on finding and establishing successful research collaborations

How can seeking collaborations benefit your research?

a) It increases competition among researchers. เป็นการเพิ่มการแข่งขันระหว่างนักวิจัย

b) It enhances the workload for everyone involved. เป็นการเพิ่มภาระงานให้กับทุกคนที่เกี่ยวข้อง

c) It can bring diverse expertise and resources to your research. สามารถนำความเชี่ยวชาญและทรัพยากรที่หลากหลายมาสู่การวิจัย

d) It is a time-consuming process with little benefit. เป็นกระบวนการที่ใช้เวลานานและได้ประโยชน์เพียงเล็กน้อย

Seeking Collaborations and Research Funds

- the significance of applying for research grants to secure funding.

Common Mistakes in Proposal Writing:

- Failure to provide the proper context to **frame the research question**.
- Failure to **delimit** the boundary conditions for the research.
- Failure to **cite** landmark studies-limited knowledge
- Failure to accurately present the theoretical and empirical contributions by other researchers.
- Failure to stay focused on the research question.
- Failure to develop a coherent and persuasive (argument for the proposed research.
- Too much detail on minor issues, but not enough detail on major issues.
- Too much rambling going "all over the map" without a clear sense of direction.
- Too many citation lapses and incorrect references.

Strategies for Efficient Publishing

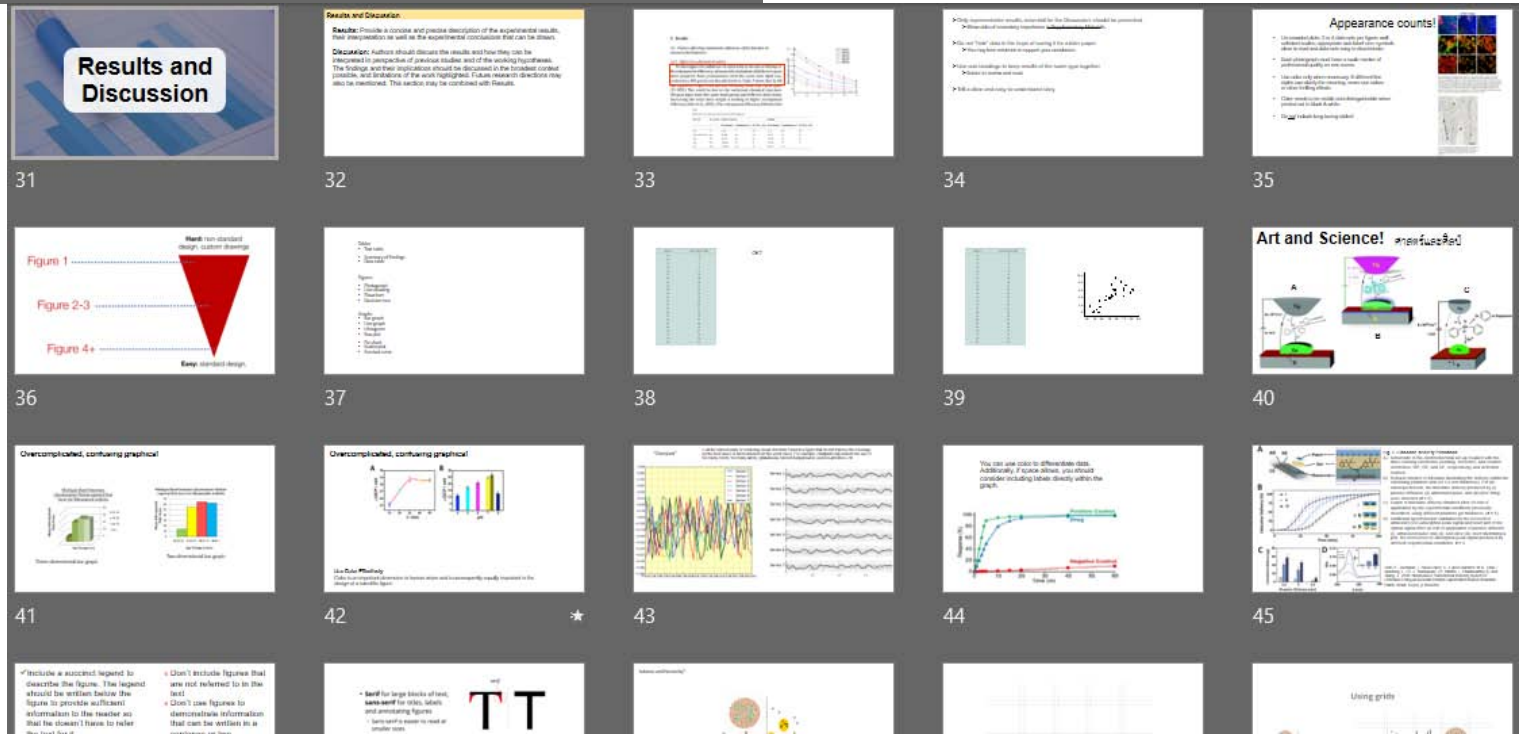
- Design a robust research plan that minimizes chances of rejection.
- The importance of identifying suitable journals for publication.
- Share secrets to successful publication as a reviewer and editor.

  - ***ECS Sensors Plus*** https://iopscience.iop.org/journal/2754-2726
  - ***Journal of The Electrochemical Society***: Sensor Reviews II https://bit.ly/41oRBtF
  - ***Electroanalysis***: Electrochemical Sensors for Non-Invasive Health Monitoring https://bit.ly/3MnP5P1
  - ***Emergent Materials:*** Emerging material science trends in Nanomedicine, Biosensor, Microfluidics and 3D Bioprinting technologies https://www.springer.com/journal/42247/updates/25820966

Writing Academic Articles

Itthipon Jeerapan, Ph.D.

Division of Physical Science, Faculty of Science, Prince of Songkla University, Thailand
Center of Excellence for Trace Analysis and Biosensor, Thailand
https://itthiponweb.wixsite.com/Itthipon | itthipon.j@psu.ac.th



31 32 33 34 35

36 37 38 39 40

41 42 ★ 43 44 45

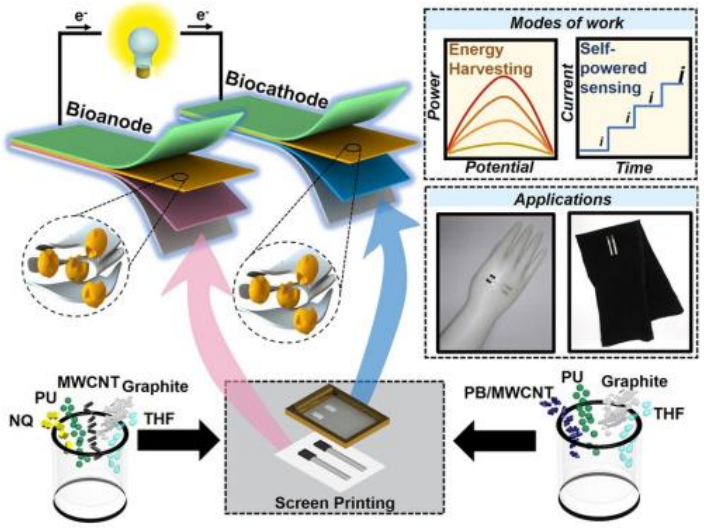
Biggest challenges when selecting journals for publication?

Choosing the Right Journal for Your Manuscript

- **Scope:** Ensure alignment with your research topic. ตรวจสอบให้แน่ใจว่าสอดคล้องกับหัวข้อการวิจัย
- **Reputation:** Consider impact and editorial board. พิจารณา impact และคณะบรรณาธิการ
- **Audience:** Evaluate relevance to your target readers. ประเมินผู้อ่าน
- **Policies:** Review submission and publication guidelines. แนวทางการส่งรีวิวและการตีพิมพ์
- **Indexing:** Check inclusion in key databases. ฐานข้อมูลที่สำคัญ
- **Feedback:** Seek advice from peers and mentors. ขอคำแนะนำ
  Impact: Assess citation metrics and influence. ประเมินตัวชี้วัดและอิทธิพลของการอ้างอิง
- **Balance:** Prioritize fit over prestige alone. ให้ความสำคัญกับความตรง/เหมาะเจาะกับเจอร์นัล มากกว่าศักดิ์ศรีเพียงอย่างเดียว *“Strike a balance between the prestige of the journal and its suitability for your manuscript. While aiming for publication in top-tier journals is desirable, prioritize journals where your research will have the greatest impact and reach the most relevant audience.”*

Screen-Printable Functional Nanomaterials for Flexible and Wearable Single-Enzyme-Based Energy-Harvesting and Self-Powered Biosensing Devices

ABSTRACT Developing flexible bioelectronics is essential to the realization of artificial intelligence devices and biomedical applications, such as wearables, but their potential is limited by sustainable energy supply. An enzymatic biofuel cell (BFC) is promising for power supply, but its use is limited by the challenges of incorporating multiple enzymes and rigid platforms. This paper shows the first example of screen-printable nanocomposite inks engineered for a single-enzyme-based energy-harvesting device and a self-powered biosensor driven by glucose on bioanode and biocathode. The anode ink is modified with naphthoquinone and multiwalled carbon nanotubes (MWCNTs), whereas the cathode ink is modified with Prussian blue/MWCNT hybrid before immobilizing with glucose oxidase. The flexible bioanode and the biocathode consume glucose. This BFC yields an open circuit voltage of 0.45 V and a maximum power density of 266 μW cm^{-2}. The wearable device coupled with a wireless portable system can convert chemical energy into electric energy and detect glucose in artificial sweat. The self-powered sensor can detect glucose concentrations up to 10 mM. Common interfering substances, including lactate, uric acid, ascorbic acid, and creatinine, have no effect on this self-powered biosensor. Additionally, the device can endure multiple mechanical deformations. New advances in ink development and flexible platforms enable a wide range of applications, including on-body electronics, self-sustainable applications, and smart fabrics.



2022 JOURNAL IMPACT FACTOR

26.6

View calculation

CiteScore 2022

32.6

CiteScore rank 2022

Category	Rank	Percentile
Engineering Electrical and Electronic Engineering	#4/738	99th
Materials Science Surfaces, Coatings and Films	#3/131	98th
Materials Science	#6/271	97th

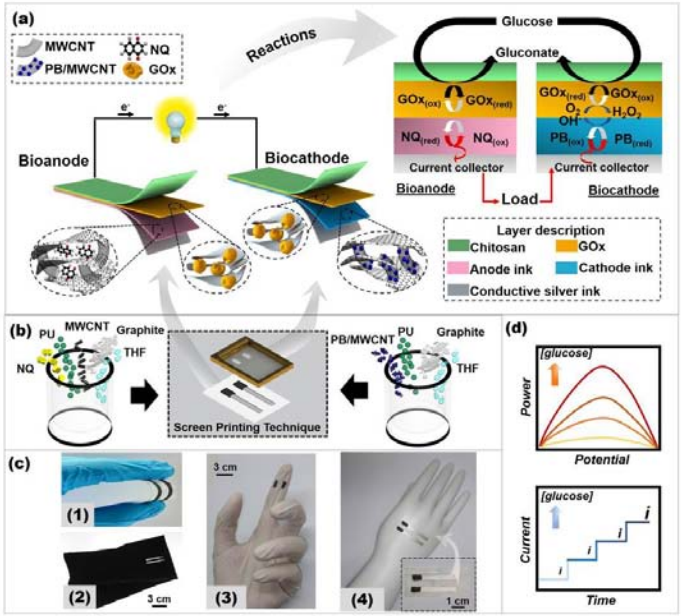


Fig. 1 The conceptual presentation of a screen-printed and flexible single-enzyme-based system for harvesting energy from glucose and self powered sensing glucose. **a** The components of a screen-printed glucose BFC along with redox reactions occurring on the bioanode and the bio cathode. **b** Preparation of the screen-printable inks for the anode and the cathode. **c** Photographs of a screen-printed glucose BFC on (1) PET, (2 a stretchable textile (arm sleeve), (3) a glove (fingertip), and (4) a stretchable epidermal tattoo attached to a hand model. **d** The working opera tion of a screen-printed glucose BFC on (top and bottom) energy-harvesting and self-powered sensing modes

Veenuttranon, K., Kaewpradub, K. and **Jeerapan, I.***, 2023. ***Nano-Micro Letters***, 15(1), p.85.

Highlighted in News: nanowerk

MATERIALS SCIENCE, MULTIDISCIPLINARY - SCIE

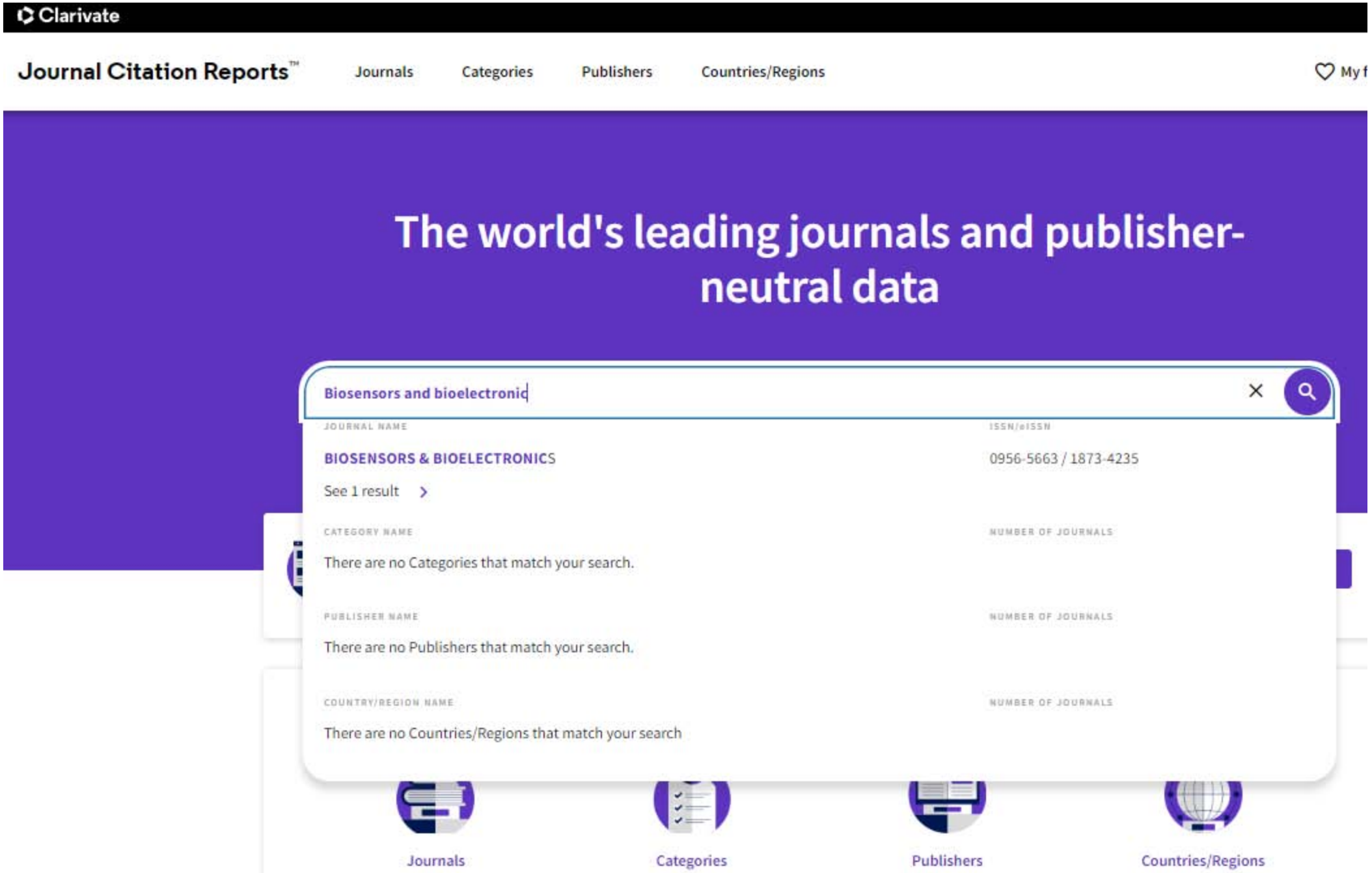
Journal name	ISSN	eISSN	Category	Total Citations	2022 JIF	JIF Quartile	2022 JCI	% of OA Gold
Nature Energy	2058-7546	2058-7546	MATERIALS SCIENCE, MULTIDISCIPLINARY - SCIE	41,749	56.7	Q1	8.53	7.88 %
NATURE MATERIALS	1476-1122	1476-4660	MATERIALS SCIENCE, MULTIDISCIPLINARY - SCIE	112,359	41.2	Q1	6.64	4.43 %
Joule	2542-4351	2542-4351	MATERIALS SCIENCE, MULTIDISCIPLINARY - SCIE	32,603	39.8	Q1	4.93	77.35 %
Nature Nanotechnology	1748-3387	1748-3395	MATERIALS SCIENCE, MULTIDISCIPLINARY - SCIE	77,412	38.3	Q1	5.15	5.87 %
PROGRESS IN MATERIALS SCIENCE	0079-6425	1873-2208	MATERIALS SCIENCE, MULTIDISCIPLINARY - SCIE	27,551	37.4	Q1	2.54	20.08 %
MATERIALS SCIENCE & ENGINEERING R-REPORTS	0927-796X	1879-212X	MATERIALS SCIENCE, MULTIDISCIPLINARY - SCIE	9,601	31.0	Q1	2.09	22.78 %
ADVANCED MATERIALS	0935-9648	1521-4095	MATERIALS SCIENCE, MULTIDISCIPLINARY - SCIE	369,915	29.4	Q1	4.07	12.55 %
Advanced Energy Materials	1614-6832	1614-6840	MATERIALS SCIENCE, MULTIDISCIPLINARY - SCIE	122,806	27.8	Q1	3.68	14.09 %
Nano-Micro Letters	2311-6706	2150-5551	MATERIALS SCIENCE, MULTIDISCIPLINARY - SCIE	18,182	26.6	Q1	3.67	99.50 %
Materials Today	1369-7021	1873-4103	MATERIALS SCIENCE,	26,218	24.2	Q1	3.32	28.48 %

NANOSCIENCE & NANOTECHNOLOGY - SCIE

Journal name	ISSN	eISSN	Category	Total Citations	2022 JIF	JIF Quartile	2022 JCI	% of OA Gold
Nature Nanotechnology	1748-3387	1748-3395	NANOSCIENCE & NANOTECHNOLOGY - SCIE	77,412	38.3	Q1	5.15	5.87 %
ADVANCED MATERIALS	0935-9648	1521-4095	NANOSCIENCE & NANOTECHNOLOGY - SCIE	369,915	29.4	Q1	4.07	12.55 %
Nano-Micro Letters	2311-6706	2150-5551	NANOSCIENCE & NANOTECHNOLOGY - SCIE	18,182	26.6	Q1	3.67	99.50 %
ACS Energy Letters	2380-8195	2380-8195	NANOSCIENCE & NANOTECHNOLOGY - SCIE	48,700	22.0	Q1	3.07	7.48 %
Carbon Energy	N/A	2637-9368	NANOSCIENCE & NANOTECHNOLOGY - SCIE	2,922	20.5	Q1	1.77	86.60 %
Energy Storage Materials	2405-8297	2405-8289	NANOSCIENCE & NANOTECHNOLOGY - SCIE	38,979	20.4	Q1	2.86	10.57 %
Advanced Composites and Hybrid Materials	2522-0128	2522-0136	NANOSCIENCE & NANOTECHNOLOGY - SCIE	7,190	20.1	Q1	2.32	2.33 %
ADVANCED FUNCTIONAL MATERIALS	1616-301X	1616-3028	NANOSCIENCE & NANOTECHNOLOGY - SCIE	219,990	19.0	Q1	2.64	10.28 %
Nano Energy	2211-2855	2211-3282	NANOSCIENCE & NANOTECHNOLOGY - SCIE	107,176	17.6	Q1	2.87	9.94 %
Nano Today	1748-0132	1878-044X	NANOSCIENCE & NANOTECHNOLOGY - SCIE	15,815	17.4	Q1	1.94	10.32 %
ACS Nano	1936-0851	1936-086X	NANOSCIENCE & NANOTECHNOLOGY - SCIE	223,018	17.1	Q1	2.44	7.87 %
Small Structures	N/A	2688-4062	NANOSCIENCE & NANOTECHNOLOGY - SCIE	3,502	15.9	Q1	1.58	23.10 %
Advanced Science	N/A	2198-3844	NANOSCIENCE & NANOTECHNOLOGY - SCIE	58,343	15.1	Q1	2.11	62.45 %
Small	1613-6810	1613-6829	NANOSCIENCE &	106,155	13.3	Q1	1.86	9.15 %

MULTIDISCIPLINARY SCIENCES - SCIE

Journal name	ISSN	eISSN	Category	Total Citations	2022 JIF	JIF Quartile	2022 JCI	% of OA Gold
NATURE	0028-0836	1476-4687	MULTIDISCIPLINARY SCIENCES - SCIE	964,818	64.8	Q1	11.43	19.06 %
SCIENCE	0036-8075	1095-9203	MULTIDISCIPLINARY SCIENCES - SCIE	818,281	56.9	Q1	9.64	7.14 %
Nature Human Behaviour	2397-3374	2397-3374	MULTIDISCIPLINARY SCIENCES - SCIE	14,216	29.9	Q1	6.47	9.69 %
National Science Review	2095-5138	2053-714X	MULTIDISCIPLINARY SCIENCES - SCIE	13,369	20.7	Q1	3.18	92.75 %
Science Bulletin	2095-9273	2095-9281	MULTIDISCIPLINARY SCIENCES - SCIE	15,986	18.9	Q1	2.79	16.11 %
Nature Communications	N/A	2041-1723	MULTIDISCIPLINARY SCIENCES - SCIE	675,323	16.6	Q1	3.24	99.66 %
Science Advances	2375-2548	2375-2548	MULTIDISCIPLINARY SCIENCES - SCIE	126,245	13.6	Q1	2.84	60.58 %
PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA	0027-8424	1091-6490	MULTIDISCIPLINARY SCIENCES - SCIE	788,682	11.1	Q1	2.52	56.04 %
Research	2096-5168	2639-5274	MULTIDISCIPLINARY SCIENCES - SCIE	4,694	11.0	Q1	1.58	84.78 %
Journal of Advanced Research	2090-1232	2090-1224	MULTIDISCIPLINARY SCIENCES - SCIE	9,575	10.7	Q1	2.34	95.20 %
Research Synthesis Methods	1759-2879	1759-2887	MULTIDISCIPLINARY SCIENCES - SCIE	6,362	9.8	Q1	2.00	43.07 %
Scientific Data	N/A	2052-4463	MULTIDISCIPLINARY SCIENCES - SCIE	22,811	9.8	Q1	1.86	99.73 %
GigaScience	2047-217X	2047-217X	MULTIDISCIPLINARY SCIENCES - SCIE	9,104	9.2	Q1	2.29	96.08 %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BIOSENSORS & BIOELECTRONICS

ISSN

0956-5663

EISSN

1873-4235

JCR ABBREVIATION

BIOSENS BIOELECTRON

ISO ABBREVIATION

Biosens. Bioelectron.

Journal information

EDITION

Science Citation Index Expanded (SCIE)

CATEGORY

CHEMISTRY, ANALYTICAL - SCIE

NANOSCIENCE & NANOTECHNOLOGY - SCIE

BIOPHYSICS - SCIE

ELECTROCHEMISTRY - SCIE

BIOTECHNOLOGY & APPLIED MICROBIOLOGY - SCIE

LANGUAGES	REGION	1ST ELECTRONIC JCR YEA
English	NETHERLANDS	1997

Publisher information

PUBLISHER	ADDRESS	PUBLICATION FREQUENCY
ELSEVIER ADVANCED TECHNOLOGY	OXFORD FULFILLMENT CENTRE THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND	12 issues/year

Biosensors and Bioelectronics

Supports open access

20.6
CiteScore

12.6
Impact Factor

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Review time

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JOURNAL IMPACT FACTOR WITHOUT SELF CITATIONS

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Journal Impact Factor Trend 2022

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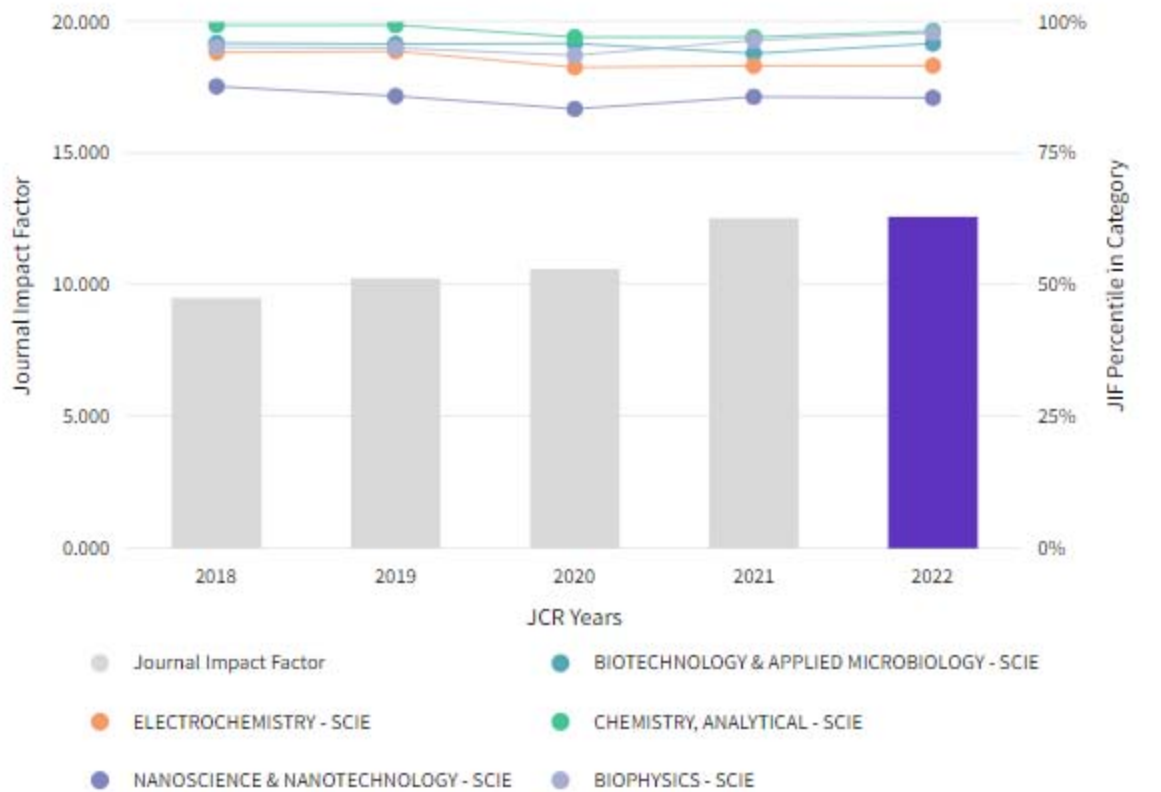

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Rank by Journal Impact Factor

Journals within a category are sorted in descending order by Journal Impact Factor (JIF) resulting in the Category Ranking below. A separate rank is shown for each category in which the journal is listed in JCR. Data for the most recent year is presented at the top of the list, with other years shown in reverse chronological order. Learn more

EDITION
Science Citation Index Expanded (SCIE)

CATEGORY
BIOPHYSICS

2/70

JCR YEAR	JIF RANK	JIF QUARTILE	JIF PERCENTILE
2022	2/70	Q1	97.9
2021	3/72	Q1	96.53
2020	5/71	Q1	93.66
2019	4/71	Q1	95.07

EDITION
Science Citation Index Expanded (SCIE)

CATEGORY
BIOTECHNOLOGY & APPLIED MICROBIOLOGY

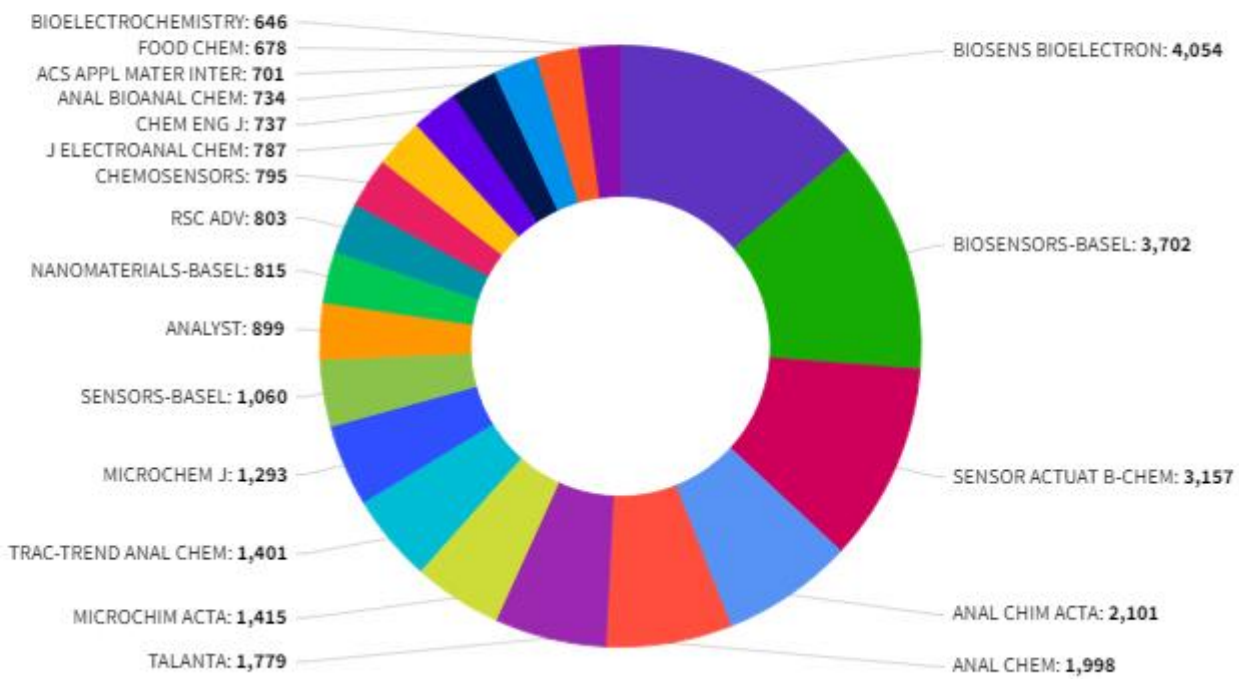
7/158

JCR YEAR	JIF RANK	JIF QUARTILE	JIF PERCENTILE
2022	7/158	Q1	95.9
2021	10/159	Q1	94.03
2020	7/159	Q1	95.91
2019	7/156	Q1	95.83

Journal Citation Relationships

Cited Data | Citing Data

Top 20 journals citing BIOSENS BIOELECTRON by number of citations



JCR YEAR

2022

BIOSENSORS & BIOELECTRONICS

ISSN

0956-5663

EISSN

1873-4235

JCR ABBREVIATION

BIOSENS BIOELECTRON

ISO ABBREVIATION

Biosens. Bioelectron.

Journal information

EDITION

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CATEGORY

CHEMISTRY, ANALYTICAL - SCIE

NANOSCIENCE & NANOTECHNOLOGY - SCIE

BIOPHYSICS - SCIE

ELECTROCHEMISTRY - SCIE

BIOTECHNOLOGY & APPLIED MICROBIOLOGY - SCIE

LANGUAGES

English

REGION

NETHERLANDS

1ST ELECTRONIC JCR YEA

1997

Publisher information

PUBLISHER

ELSEVIER ADVANCED TECHNOLOGY

ADDRESS

OXFORD FULFILLMENT CENTRE THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND

PUBLICATION FREQUENCY

12 issues/year

CHEMISTRY, ANALYTICAL | SCIE | JCR Year: 2022

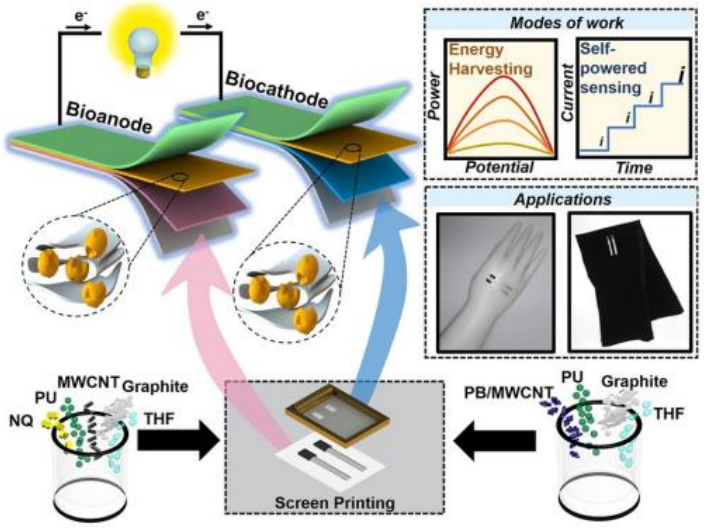
Journal name	ISSN	eISSN	Category	Total Citations	2022 JIF	JIF Quartile
TRAC-TRENDS IN ANALYTICAL CHEMISTRY	0165-9936	1879-3142	CHEMISTRY, ANALYTICAL - SCIE	30,416	13.1	Q1
BIOSENSORS & BIOELECTRONICS	0956-5663	1873-4235	CHEMISTRY, ANALYTICAL - SCIE	78,736	12.6	Q1
Trends in Environmental Analytical Chemistry	2214-1588	2214-1588	CHEMISTRY, ANALYTICAL - SCIE	1,486	11.2	Q1
ACS Sensors	2379-3694	2379-3694	CHEMISTRY, ANALYTICAL - SCIE	18,970	8.9	Q1
SENSORS AND ACTUATORS B-CHEMICAL	N/A	0925-4005	CHEMISTRY, ANALYTICAL - SCIE	121,244	8.4	Q1
Annual Review of Analytical Chemistry	1936-1327	1936-1335	CHEMISTRY, ANALYTICAL - SCIE	2,715	8.0	Q1
ANALYTICAL CHEMISTRY	0003-2700	1520-6882	CHEMISTRY, ANALYTICAL - SCIE	159,527	7.4	Q1
Analytica Chimica Acta	0003-2670	1873-4324	CHEMISTRY, ANALYTICAL - SCIE	58,142	6.2	Q1
TALANTA	0039-9140	1873-3573	CHEMISTRY, ANALYTICAL - SCIE	58,681	6.1	Q1
LAB ON A CHIP	1473-0197	1473-0189	CHEMISTRY, ANALYTICAL - SCIE	36,033	6.1	Q1
JOURNAL OF ANALYTICAL AND APPLIED PYROLYSIS	0165-2370	1873-250X	CHEMISTRY, ANALYTICAL - SCIE	20,306	6.0	Q1
MICROCHIMICA ACTA	0026-3672	1436-5073	CHEMISTRY, ANALYTICAL - SCIE	23,344	5.7	Q1
Environmental Science-Processes & Impacts	2050-7887	2050-7895	CHEMISTRY, ANALYTICAL - SCIE	7,212	5.5	Q1
SEPARATION AND PURIFICATION REVIEWS	1542-2119	1542-2127	CHEMISTRY, ANALYTICAL - SCIE	1,456	5.4	Q1
Biosensors-Basel	N/A	2079-6374	CHEMISTRY, ANALYTICAL - SCIE	8,041	5.4	Q1
CRITICAL REVIEWS IN ANALYTICAL CHEMISTRY	1040-8347	1547-6510	CHEMISTRY, ANALYTICAL - SCIE	3,544	5.0	Q1
MICROCHEMICAL JOURNAL	0026-265X	1095-9149	CHEMISTRY, ANALYTICAL - SCIE	25,481	4.8	Q1
Journal of Electroanalytical Chemistry	1572-6657	1873-2569	CHEMISTRY, ANALYTICAL - SCIE	37,373	4.5	Q1
JOURNAL OF THERMAL ANALYSIS AND CALORIMETRY	1388-6150	1588-2926	CHEMISTRY, ANALYTICAL - SCIE	32,518	4.4	Q1
ANALYTICAL AND BIOANALYTICAL CHEMISTRY	1618-2642	1618-2650	CHEMISTRY, ANALYTICAL - SCIE	35,928	4.3	Q1
BioChip Journal	1976-0280	2092-7843	CHEMISTRY, ANALYTICAL - SCIE	1,005	4.3	Q1
REVIEWS IN ANALYTICAL CHEMISTRY	0793-0135	2191-0189	CHEMISTRY, ANALYTICAL - SCIE	593	4.3	Q1
ANALYST	0003-2654	1364-5528	CHEMISTRY, ANALYTICAL - SCIE	35,495	4.2	Q2
Chemosensors	N/A	2227-9040	CHEMISTRY, ANALYTICAL - SCIE	3,399	4.2	Q2
JOURNAL OF CHROMATOGRAPHY A	0021-9673	1873-3778	CHEMISTRY, ANALYTICAL - SCIE	55,926	4.1	Q2

NANOSCIENCE & NANOTECHNOLOGY | SCIE | JCR Year: 2022

Journal name	ISSN	eISSN	Category	Total Citations	2022 JIF	JIF Rank	5 Year JIF	5 Year JIF Quartile
Nature Reviews Materials	2058-8437	2058-8437	NANOSCIENCE & NANOTECHNOLOGY - SCIE	31,441	83.5	1/108	90.2	Q1
Nature Nanotechnology	1748-3387	1748-3395	NANOSCIENCE & NANOTECHNOLOGY - SCIE	77,412	38.3	2/108	39.9	Q1
ADVANCED MATERIALS	0935-9648	1521-4095	NANOSCIENCE & NANOTECHNOLOGY - SCIE	369,915	29.4	3/108	30.2	Q1
Nano-Micro Letters	2311-6706	2150-5551	NANOSCIENCE & NANOTECHNOLOGY - SCIE	18,182	26.6	4/108	22.8	Q1
ACS Energy Letters	2380-8195	2380-8195	NANOSCIENCE & NANOTECHNOLOGY - SCIE	48,700	22.0	5/108	21.9	Q1
Carbon Energy	N/A	2637-9368	NANOSCIENCE & NANOTECHNOLOGY - SCIE	2,922	20.5	6/108	20.9	Q1
Energy Storage Materials	2405-8297	2405-8289	NANOSCIENCE & NANOTECHNOLOGY - SCIE	38,979	20.4	7/108	19.5	Q1
Advanced Composites and Hybrid Materials	2522-0128	2522-0136	NANOSCIENCE & NANOTECHNOLOGY - SCIE	7,190	20.1	8/108	15.6	Q1
ADVANCED FUNCTIONAL MATERIALS	1616-301X	1616-3028	NANOSCIENCE & NANOTECHNOLOGY - SCIE	219,990	19.0	9/108	19.2	Q1
Nano Energy	2211-2855	2211-3282	NANOSCIENCE & NANOTECHNOLOGY - SCIE	107,176	17.6	10/108	17.5	Q1
Nano Today	1748-0132	1878-044X	NANOSCIENCE & NANOTECHNOLOGY - SCIE	15,815	17.4	11/108	17.9	Q1
ACS Nano	1936-0851	1936-086X	NANOSCIENCE & NANOTECHNOLOGY - SCIE	223,018	17.1	12/108	17.1	Q1
Small Structures	N/A	2688-4062	NANOSCIENCE & NANOTECHNOLOGY - SCIE	3,502	15.9	13/108	15.9	Q1
Advanced Science	N/A	2198-3844	NANOSCIENCE & NANOTECHNOLOGY - SCIE	58,343	15.1	14/108	16.7	Q1

Screen-Printable Functional Nanomaterials for Flexible and Wearable Single-Enzyme-Based Energy-Harvesting and Self-Powered Biosensing Devices

ABSTRACT Developing flexible bioelectronics is essential to the realization of artificial intelligence devices and biomedical applications, such as wearables, but their potential is limited by sustainable energy supply. An enzymatic biofuel cell (BFC) is promising for power supply, but its use is limited by the challenges of incorporating multiple enzymes and rigid platforms. This paper shows the first example of screen-printable nanocomposite inks engineered for a single-enzyme-based energy-harvesting device and a self-powered biosensor driven by glucose on bioanode and biocathode. The anode ink is modified with naphthoquinone and multiwalled carbon nanotubes (MWCNTs), whereas the cathode ink is modified with Prussian blue/MWCNT hybrid before immobilizing with glucose oxidase. The flexible bioanode and the biocathode consume glucose. This BFC yields an open circuit voltage of 0.45 V and a maximum power density of 266 μW cm^{-2}. The wearable device coupled with a wireless portable system can convert chemical energy into electric energy and detect glucose in artificial sweat. The self-powered sensor can detect glucose concentrations up to 10 mM. Common interfering substances, including lactate, uric acid, ascorbic acid, and creatinine, have no effect on this self-powered biosensor. Additionally, the device can endure multiple mechanical deformations. New advances in ink development and flexible platforms enable a wide range of applications, including on-body electronics, self-sustainable applications, and smart fabrics.



2022 JOURNAL IMPACT FACTOR

26.6

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CiteScore 2022

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CiteScore rank 2022

Category	Rank	Percentile
Engineering Electrical and Electronic Engineering	#4/738	99th
Materials Science Surfaces, Coatings and Films	#3/131	98th
Materials Science	#6/271	97th

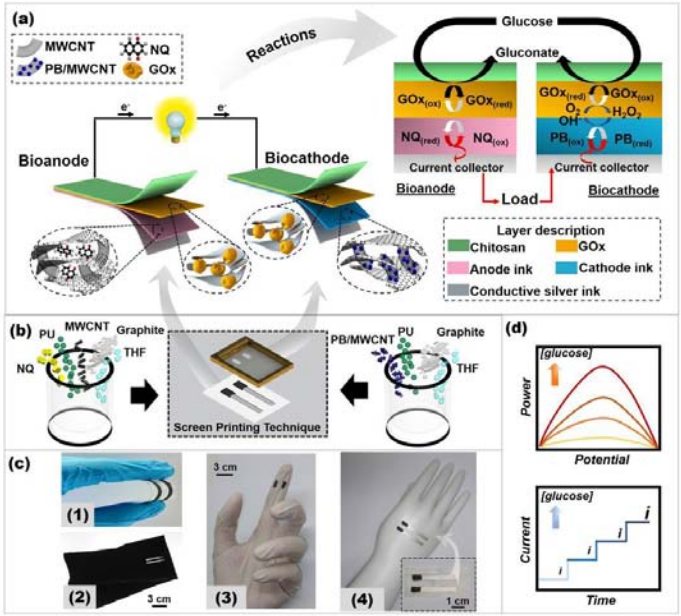

Fig. 1 The conceptual presentation of a screen-printed and flexible single-enzyme-based system for harvesting energy from glucose and self powered sensing glucose. **a** The components of a screen-printed glucose BFC along with redox reactions occurring on the bioanode and the bio cathode. **b** Preparation of the screen-printable inks for the anode and the cathode. **c** Photographs of a screen-printed glucose BFC on (1) PET, (2 a stretchable textile (arm sleeve), (3) a glove (fingertip), and (4) a stretchable epidermal tattoo attached to a hand model. **d** The working opera tion of a screen-printed glucose BFC on (top and bottom) energy-harvesting and self-powered sensing modes

Veenuttranon, K., Kaewpradub, K. and **Jeerapan, I.***, 2023. ***Nano-Micro Letters***, 15(1), p.85.

Highlighted in News: nanowerk

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Nano-Micro Letters

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View calculation

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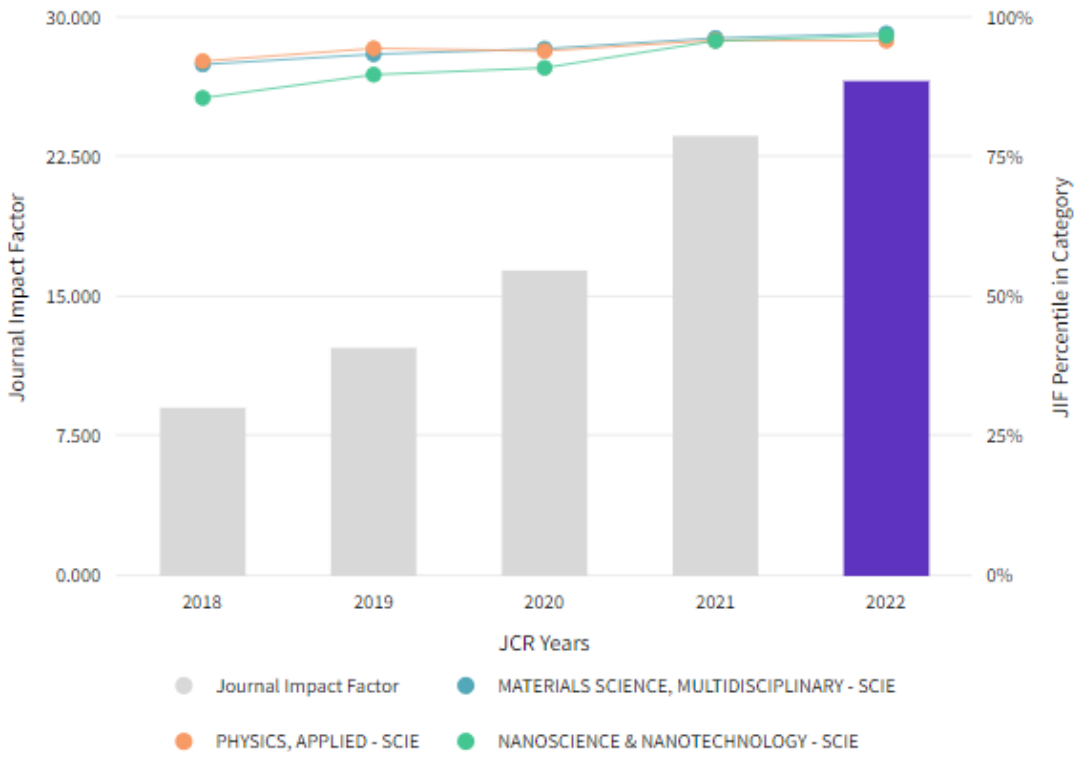

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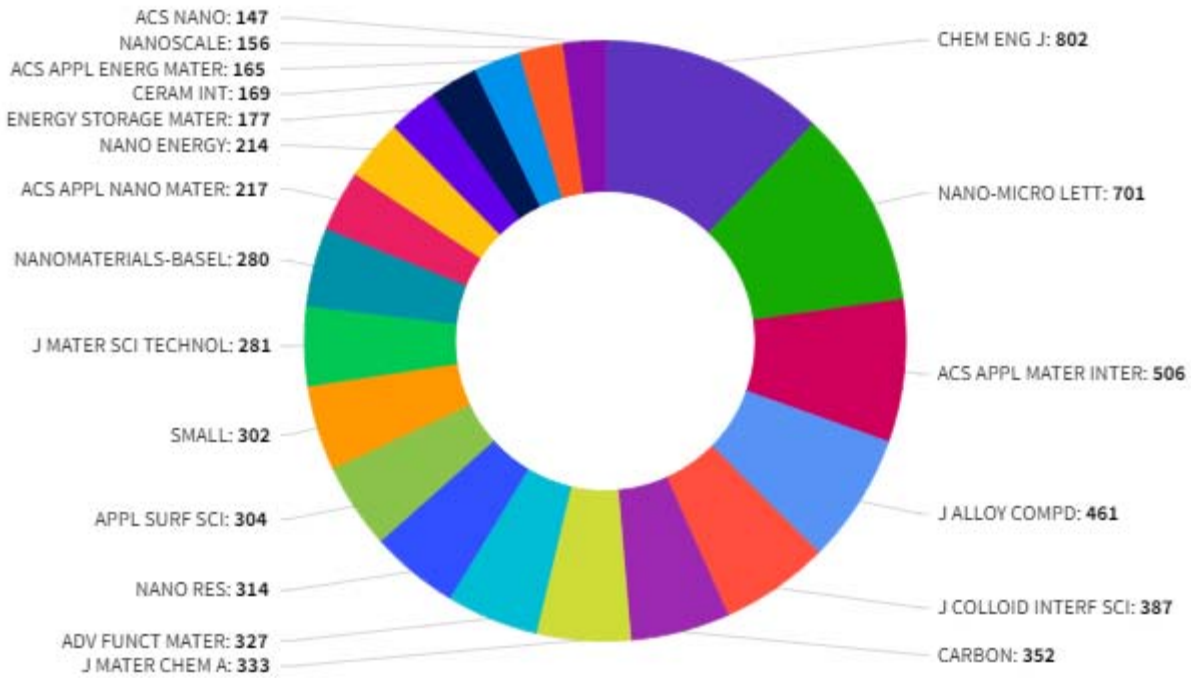

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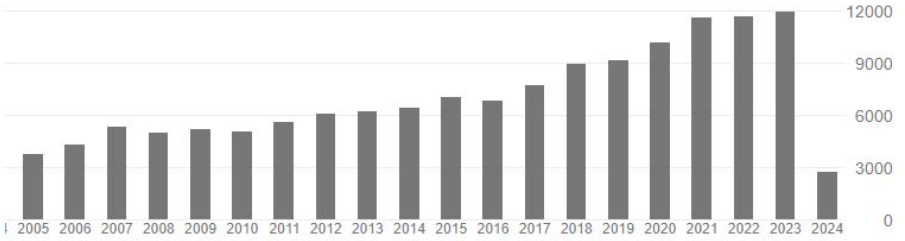

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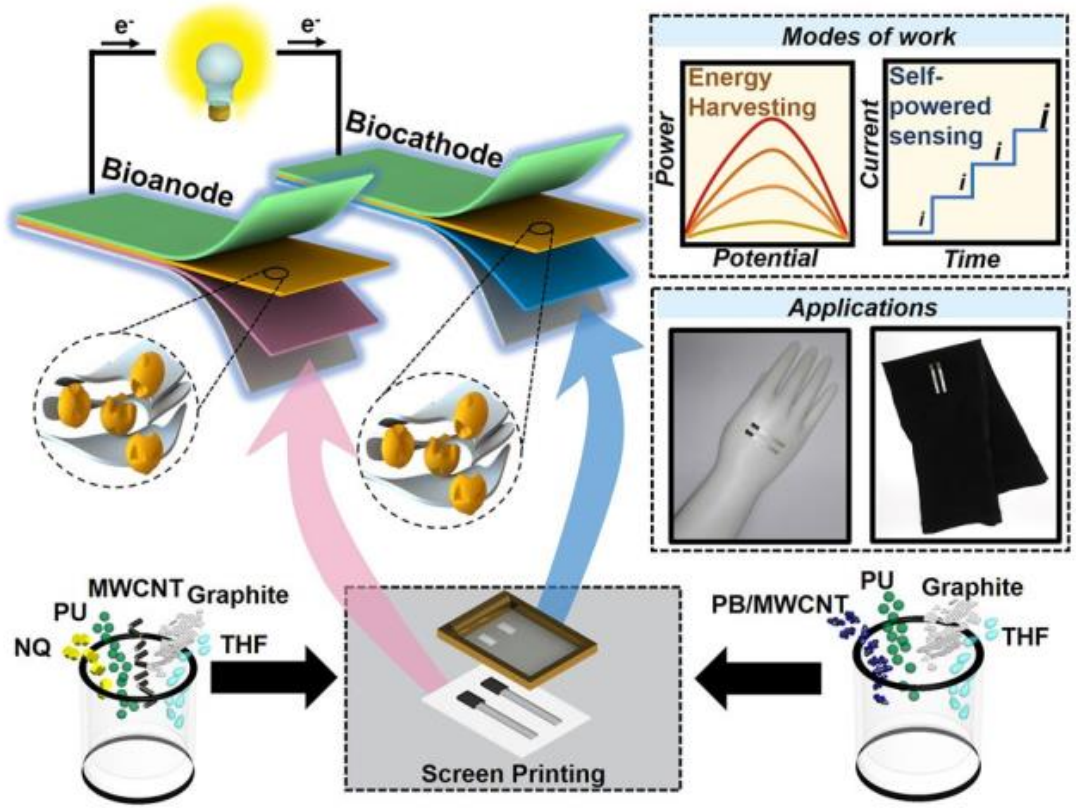
Mar 04, 2024

Ideas?

Problems?

ABSTRACT Developing flexible bioelectronics is essential to the realization of artificial intelligence devices and biomedical applications, such as wearables, but their potential is limited by sustainable energy supply. An enzymatic biofuel cell (BFC) is promising for power supply, but its use is limited by the challenges of incorporating multiple enzymes and rigid platforms. This paper shows the first example of screen-printable nanocomposite inks engineered for a single-enzyme-based energy-harvesting device and a self-powered biosensor driven by glucose on bioanode and biocathode. The anode ink is modified with naphthoquinone and multiwalled carbon nanotubes (MWCNTs), whereas the cathode ink is modified with Prussian blue/MWCNT hybrid before immobilizing with glucose oxidase. The flexible bioanode and the biocathode consume glucose. This BFC yields an open circuit voltage of 0.45 V and a maximum power density of 266 μW cm^{-2}. The wearable device coupled with a wireless portable system can convert chemical energy into electric energy and detect glucose in artificial sweat. The self-powered sensor can detect glucose concentrations up to 10 mM. Common interfering substances, including lactate, uric acid, ascorbic acid, and creatinine, have no effect on this self-powered biosensor. Additionally, the device can endure multiple mechanical deformations. New advances in ink development and flexible platforms enable a wide range of applications, including on-body electronics, self-sustainable applications, and smart fabrics.



✉ Itthipon Jeerapan, itthipon.j@psu.ac.th

1 Introduction

Flexible bioelectronics have many useful and versatile applications, such as wearables [1]. Unlike rigid, traditional platforms, a flexible device offers a unique opportunity to match the curvature of soft surfaces. For instance, modern on-body electronics, such as smart fabrics for tracking motion and monitoring biochemicals, are rapidly expanding. Soft robots and humanoid robots also benefit from flexible systems. Smart flexible devices open new opportunities for continuous fitness monitoring and are revolutionizing health care by enabling wellness monitoring. Regardless of the application, these devices should be fully integrated, lightweight, flexible, and autonomous from both a practical and esthetic perspective. To achieve the desired functions, it is necessary to develop several strategies. Further decreasing device size and fabrication costs are among them. To achieve this, incorporating customized materials and engineering ideas into a new design of flexible bioelectronics is essential.

A key barrier to the advancement of fully integrated flexible devices is the lack of energy. To overcome the energy requirements of soft devices, a common approach is to enhance the volumetric capacity and power density of flexible energy storage devices [2]. However, traditional systems still use rigid batteries without a self-charging technique; therefore, they must be periodically charged or replaced [3]. In addition to energy-storage systems, there is a growing interest in energy-harvesting technologies that convert surrounding energy (e.g., biomechanical, biochemical, and solar energy) into electricity. Motivated by the desire to realize the energy-sustainable concept, enzymatic biofuel cells (BFCs), which convert biochemical energy available in human biofluids into electricity, are among the most powerful alternatives for energy generation. This is due to their advantages for operation with enzymes that are active at ambient temperature and under mild physiological conditions, allowing on-body, implantable, and ingestible applications in biological systems [4–6].

Significantly, in addition to being energy-conversion devices, BFCs can also be used as self-powered electrochemical biosensors to sense analytes without external power [4]. Since the generated power is typically proportionate to the analyte concentration, BFCs can monitor the level of a specific substrate in real time as a stand-alone device. Enzymatic BFCs use enzymes (e.g., glucose oxidase (GOx)) as biocatalysts to convert the chemical energy of biofuels (e.g., glucose) in a body fluid into electrical energy. Thanks to the high selectivity of enzymes, it is not necessary to separate the anodic and cathodic counterparts, enabling the straightforward design of a two-electrode system that could be further developed into practical miniaturized devices. As of now, self-powered BFCs have been successfully used to detect a variety of chemicals, such as glucose [7], cholesterol [8], and lactate [9].

Even though substantial advances have been made in developing BFC-based energy harvesters or self-powered biosensors, most current technologies use BFCs with a two-enzyme configuration (using different enzymes on a bioanode and a biocathode). The development of bi-enzymatic BFCs faces critical challenges. First, different enzymes require different operating conditions, such as pH. There is a significant difference between laboratory applications using gold-standard setups with separation membranes and chambers and real-world applications. Managing pH is too challenging for wearable devices and miniaturized devices; it is hard to control one pH for the wearable anode while adjusting the other pH value for the cathode. Those factors can affect the BFC performance. In addition, the use of two enzymes complicates the BFC design and increases its cost. For example, GOx costs only 0.4 USD per 100 units, whereas laccase and bilirubin oxidase cost much more (30–700 USD per 100 units). Hence, we aim to address such grand challenges by engineering new BFCs with only one enzyme on the anode and the cathode.

Despite the advantages of wearable BFCs and the single-enzyme-BFC configuration, no reports exist today to demonstrate a single-enzyme BFC and self-powered biosensors on any flexible or printed platforms (Table S1). Previously, a BFC powered by the glucose for both the bioanode and the biocathode, yielding the maximum powder of 3.5 μW cm^{-2}, was illustrated [10]. On this bioanode, GOx was immobilized on a modified graphite rod electrode. In fact, GOx was co-immobilized with an additional enzyme, i.e., horseradish peroxidase (HRP) on the rigid cathode. Note that the extra cost due to HRP (~ 13 USD per 100 unit) would increase the fabrication cost. Another BFC on rigid graphite rods was reported [7]. Both the bioanode and the biocathode were immobilized with the same enzyme (i.e., GOx), while the BFCs operated by GOx oxidation at the bioanode and H_2O_2 reduction at the biocathode. The power output of the system obtained only 10.9 μW cm^{-2}. Notably, these BFC designs are limited by the use of rigid platforms, that are hard to integrate into biosystems. To the best of our knowledge there are no publications on any flexible single-enzyme BFCs that demonstrate the applicability in simulated biological fluids.

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This paper presents the first example of screen-printable functional inks engineered for a flexible single-enzyme-based energy-harvesting device and a self-powered biosensor, which use only glucose on the bioanode and biocathode (Fig. 1). We developed new printable and highly flexible inks for both the anode and the cathode. In addition to demonstrating a single-enzyme-based BFC design, a key novelty of the present work is the customized formulations of nanocomposites. These nanocomposites have high conductivity and can adhere to a range of versatile substrates, including stretchable textile, plastic, stretchable epidermal tattoo, and rubber-based materials. The reactions occurring

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"Learning is a treasure that will follow its owner everywhere."

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Think about WHY you want to publish your work.

- Is it **new and interesting**?
- Is it a current **hot topic**?
- Have you **provided solutions** to some difficult problems?
- Are you **ready** to publish at this point?

If all answers are “yes”, then start preparations for your manuscript

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- Contains a CLEAR, USEFUL, and EXCITING scientific message.
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- **No secret recipe for success** – just some simple rules, dedication, and hard work.

- **Editors and reviewers** are all busy scientists, just like you

– make things easy to **save their time!**

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Editors and reviewers

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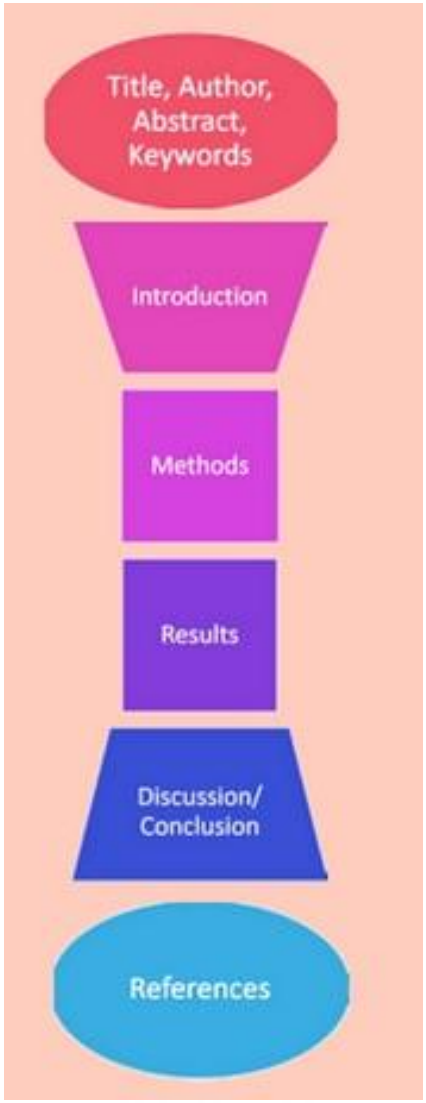

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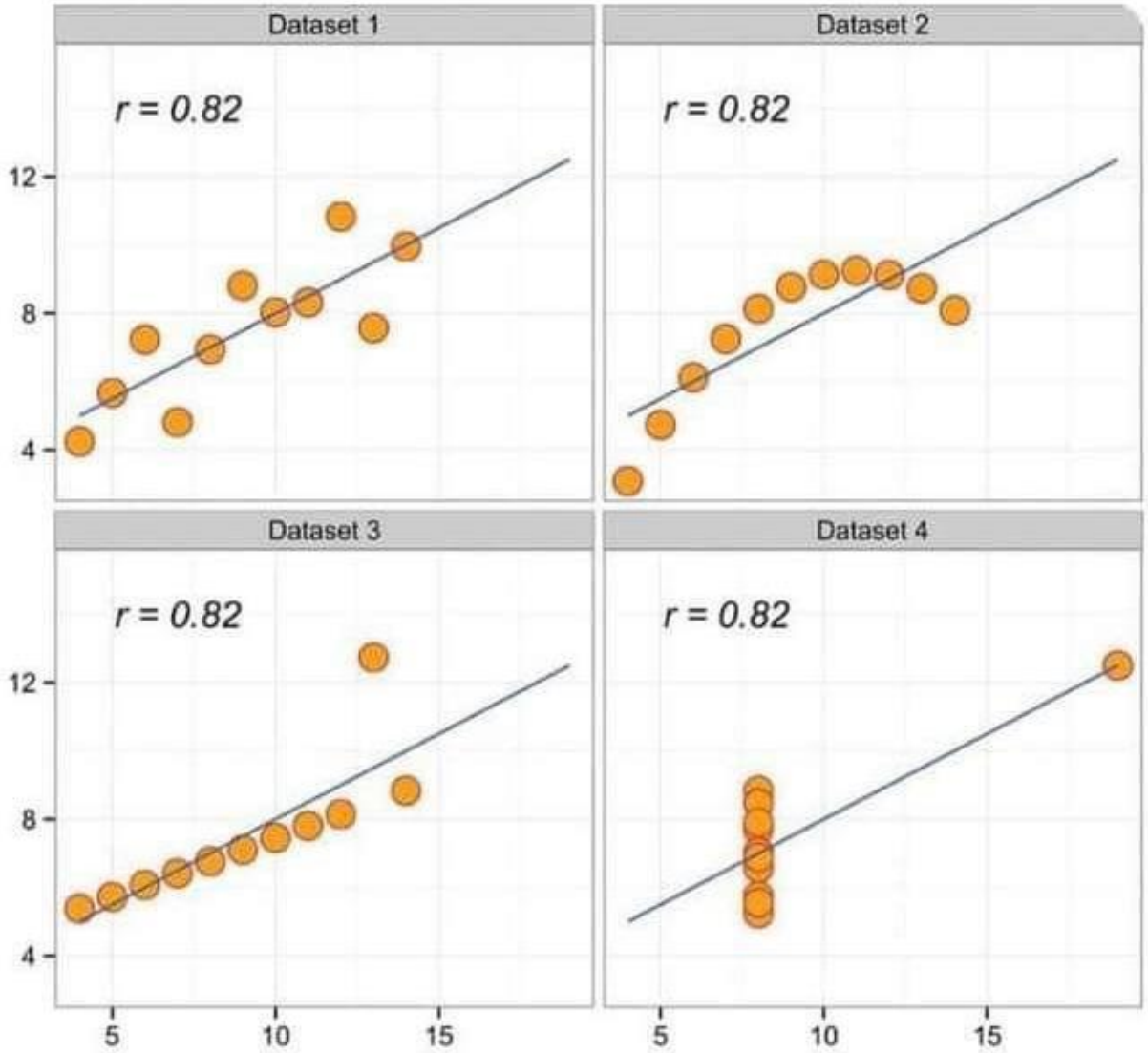
"A picture is worth a thousand words"

ไม่พูดมาก เจ็บคอ

Data = Presents a compelling argument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Dataset 3
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Dataset 4
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- Just start writing
- First drafts can be messy.

“Try beginning with figures/tables or an outline to get started”

Proofreading/Editing

- ✓ Avoid over-repetition of information
- ✓ Draw clear and explicit links between ideas (don't rely on readers to connect the dots themselves)
- ✓ Be specific and direct.
- ✓ Active / passive voice ""Use active voice when suitable!"

- x "very often" how often, exactly?
- x "Very long" how many hours?
- x Double negatives. "not uncommon"
- x Many idea in one paragraph
- x ". . . *a decrease in circulating cortisol levels to 120 ng/ml . . .*" **= meaningless!!!** if the reader does not know what is expected as normal or what the value was before experimentation or intervention. Establishing a baseline allows the writer to report how or why the change from this baseline is physiologically noteworthy.
- x *"…shows higher sensitivity…"*
- x *"These findings prompted health agencies to recommend more physical exercise . . ."* more physical exercise than what?

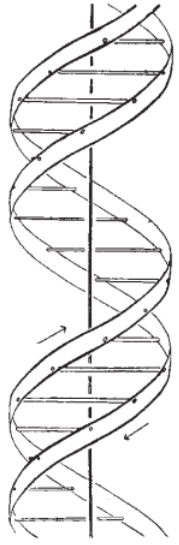
MOLECULAR STRUCTURE OF NUCLEIC ACIDS

A Structure for Deoxyribose Nucleic Acid

WE wish to suggest a structure for the salt of deoxyribose nucleic acid (D.N.A.). This structure has novel features which are of considerable biological interest.

A structure for nucleic acid has already been proposed by Pauling and Corey[1]. They kindly made their manuscript available to us in advance of publication. Their model consists of three inter-twined chains, with the phosphates near the fibre axis, and the bases on the outside. In our opinion, this structure is unsatisfactory for two reasons: (1) We believe that the material which gives the X-ray diagrams is the salt, not the free acid. Without the acidic hydrogen atoms it is not clear what forces would hold the structure together, especially as the negatively charged phosphates near the axis will repel each other. (2) Some of the van der Waals distances appear to be too small.

Another three-chain structure has also been suggested by Fraser (in the press). In his model the phosphates are on the outside and the bases on the inside, linked together by hydrogen bonds. This structure as described is rather ill-defined, and for this reason we shall not comment on it.



This figure is purely diagrammatic. The two ribbons symbolize the two phosphate—sugar chains, and the horizontal rods the pairs of bases holding the chains together. The vertical line marks the fibre axis

We wish to put forward a radically different structure for the salt of deoxyribose nucleic acid. This structure has two helical chains each coiled round the same axis (see diagram). We have made the usual chemical assumptions, namely, that each chain consists of phosphate di-ester groups joining β-D-deoxy-ribofuranose residues with 3′,5′ linkages. The two chains (but not their bases) are related by a dyad perpendicular to the fibre axis. Both chains follow right-handed helices, but owing to the dyad the sequences of the atoms in the two chains run in opposite directions. Each chain loosely resembles Furberg's[2] model No. 1; that is, the bases are on the inside of the helix and the phosphates on the outside. The configuration of the sugar and the atoms near it is close to Furberg's 'standard configuration', the sugar being roughly perpendicular to the attached base. There

Watson, James D., and Francis HC Crick. "Molecular structure of nucleic acids: a structure for deoxyribose nucleic acid." ***Nature*** 171.4356 (1953): 737-738.

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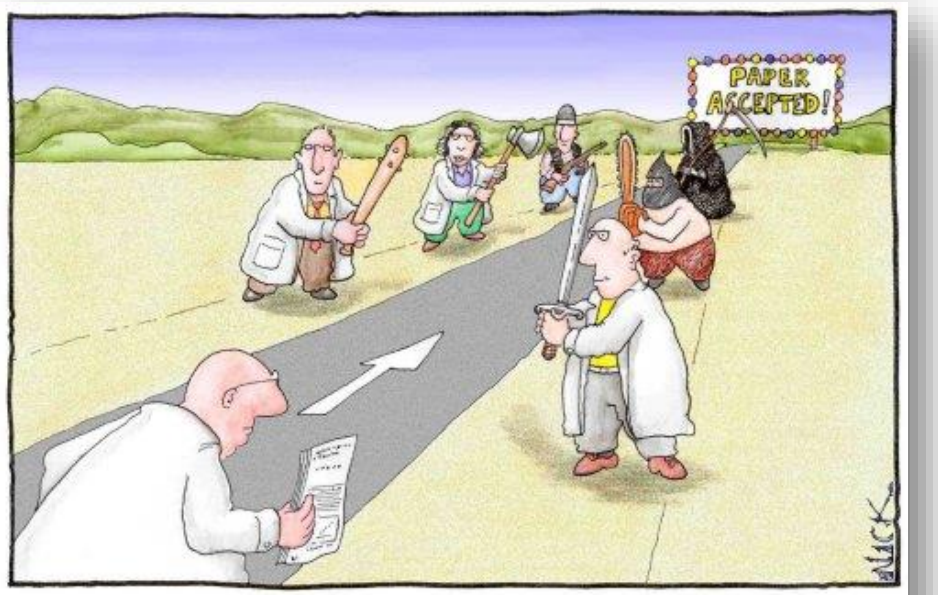

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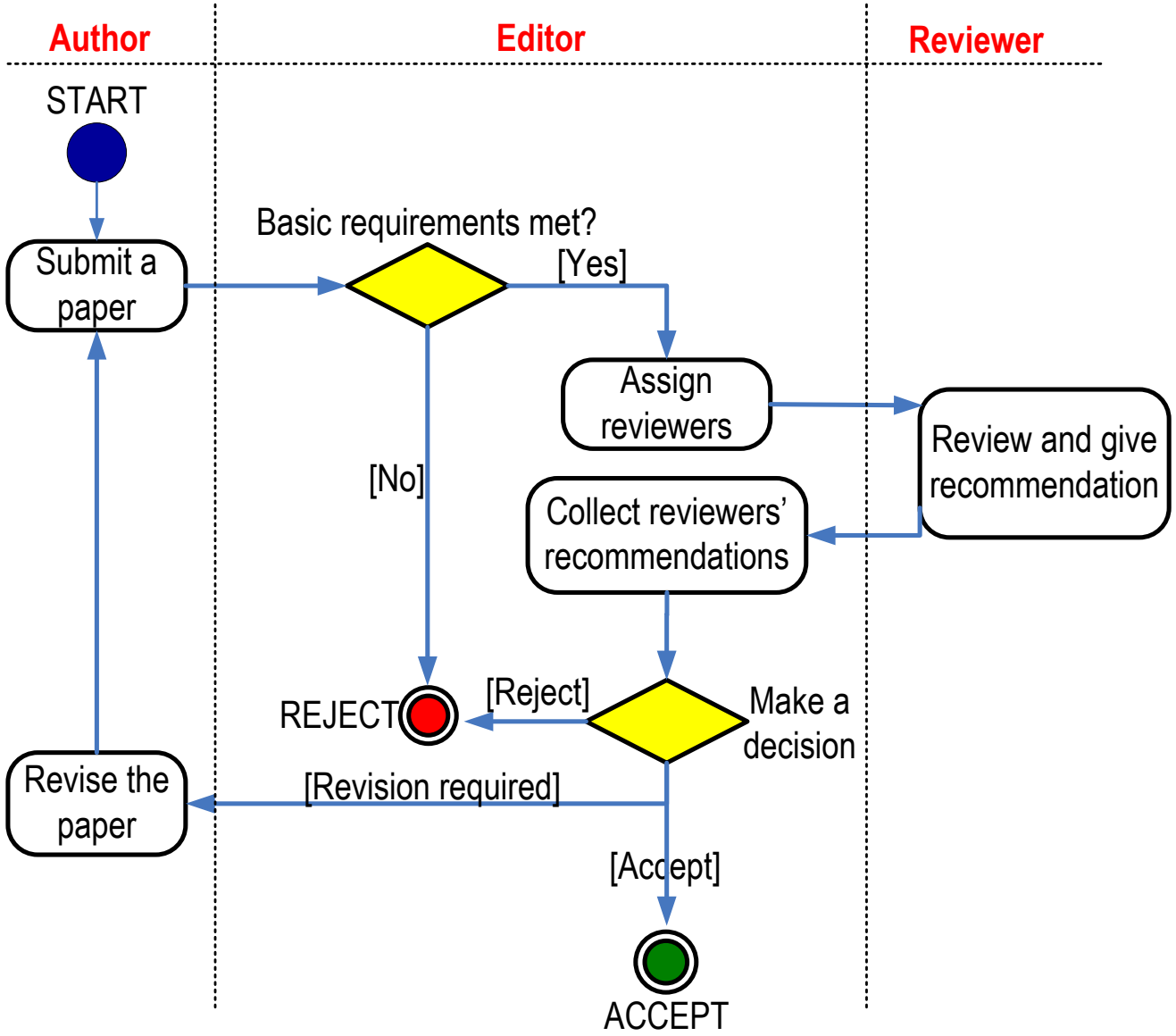

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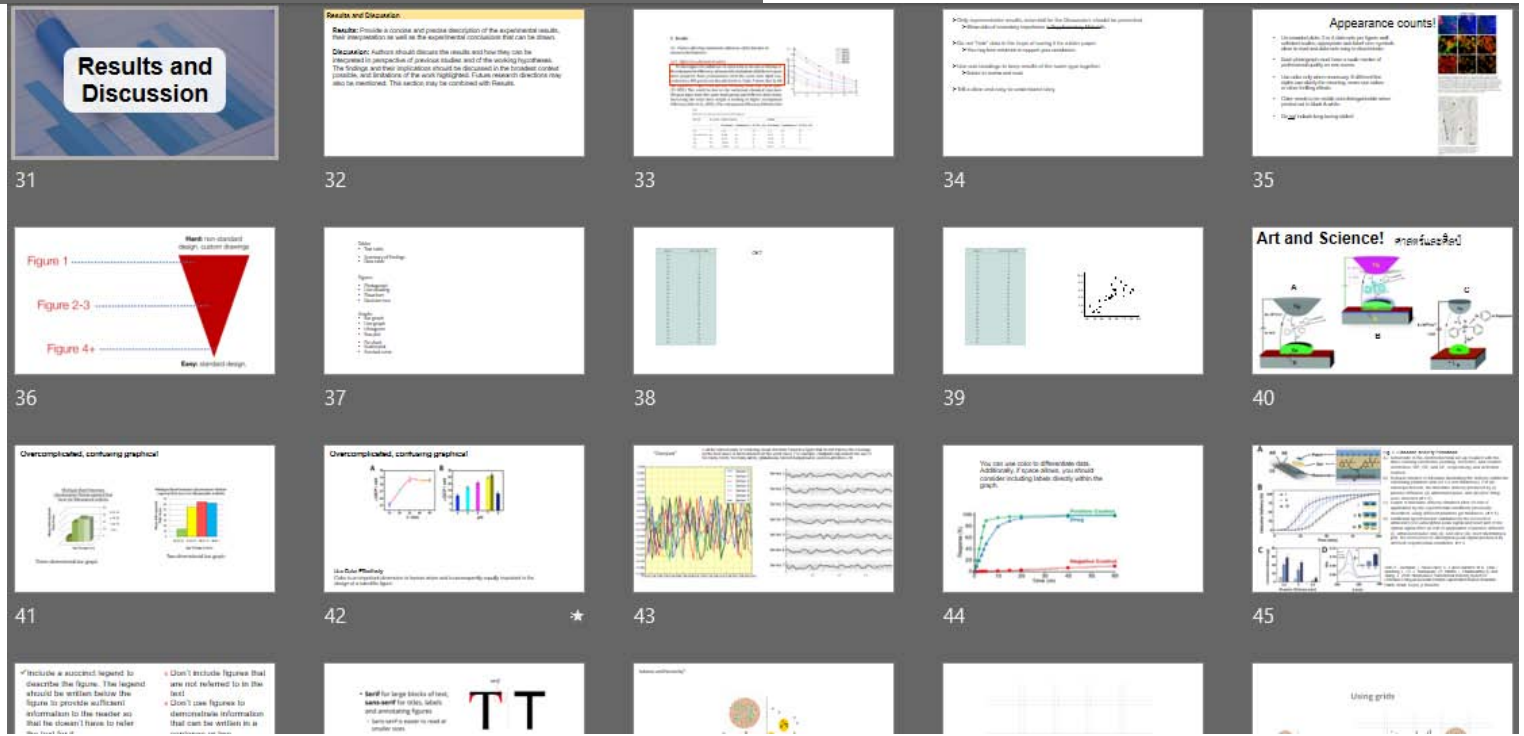
Writing Academic Articles

Itthipon Jeerapan, Ph.D.

Division of Physical Science, Faculty of Science, Prince of Songkla University, Thailand
Center of Excellence for Trace Analysis and Biosensor, Thailand
https://itthiponweb.wixsite.com/Itthipon | itthipon.j@psu.ac.th



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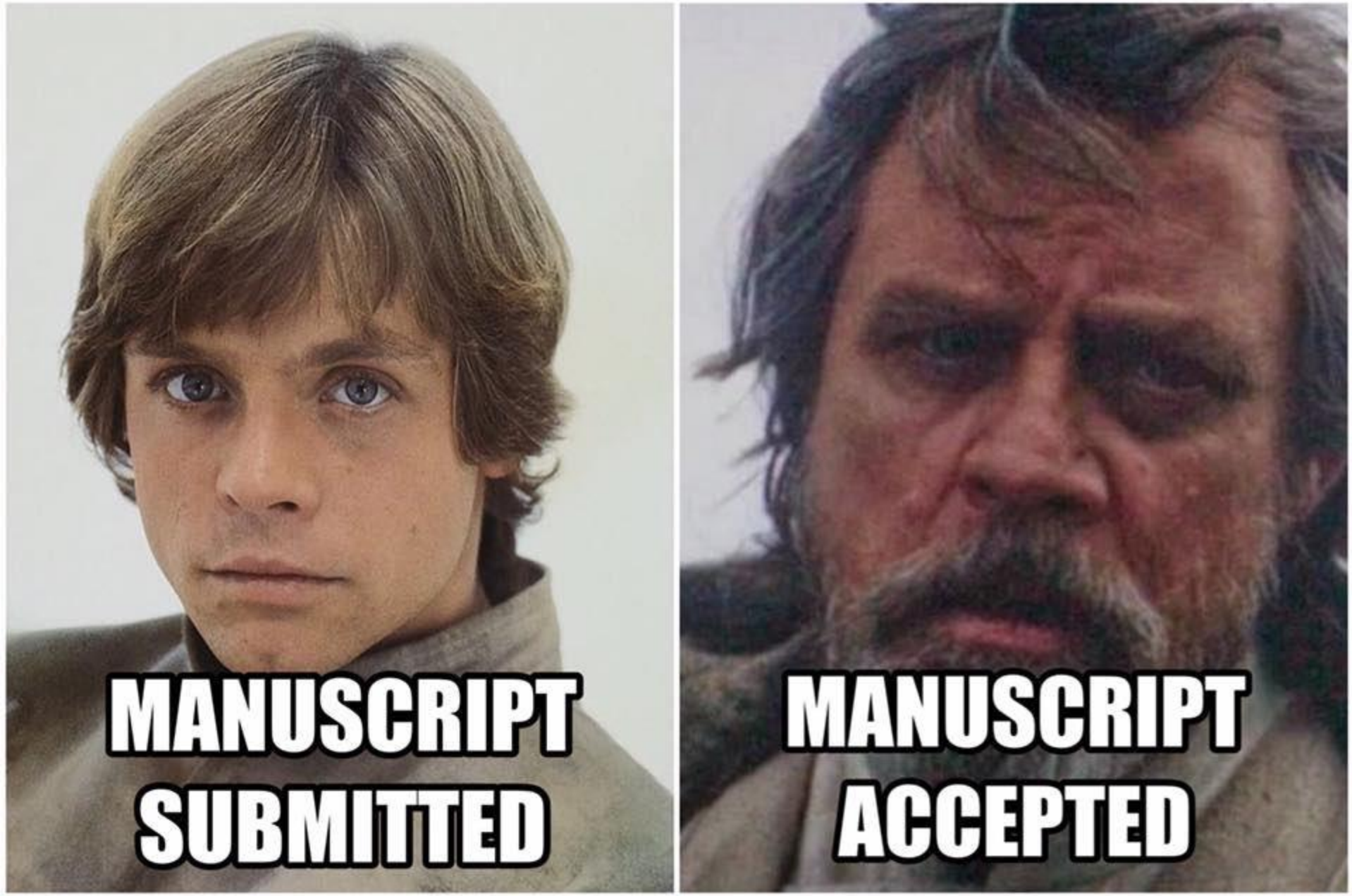
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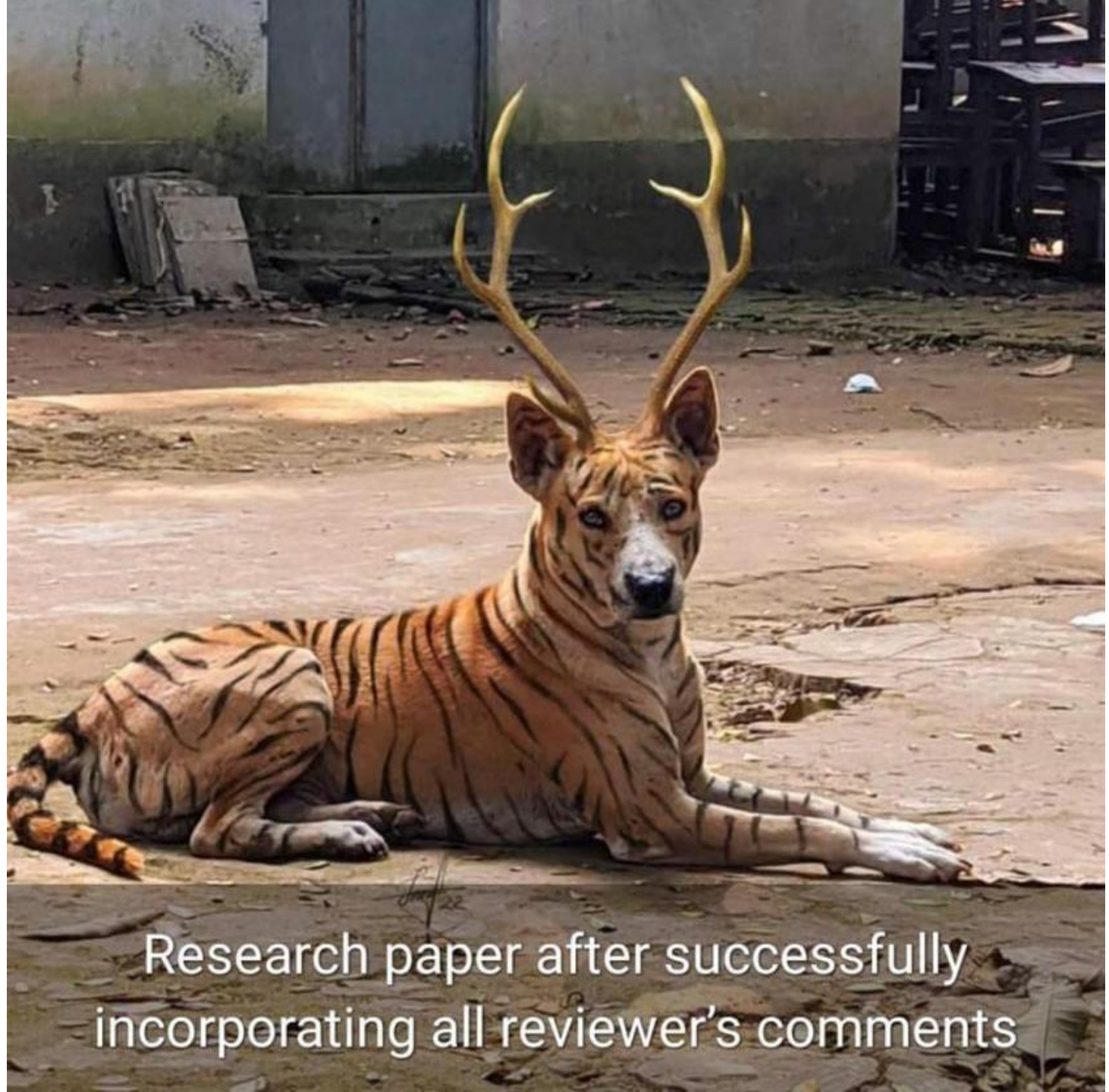
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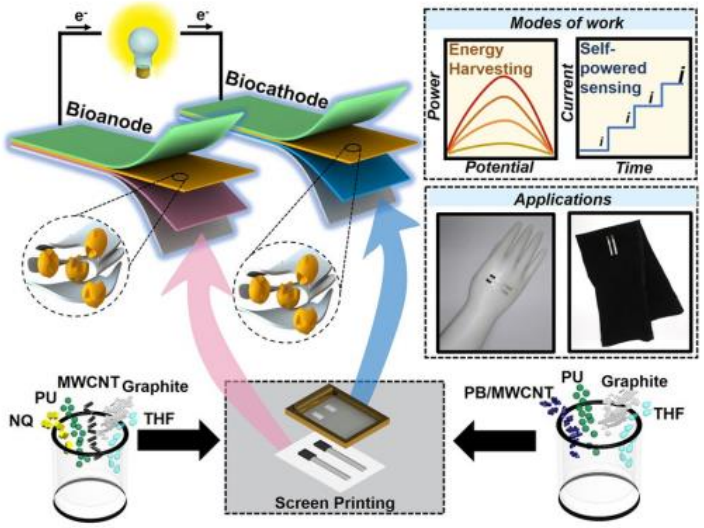
Screen-Printable Functional Nanomaterials for Flexible and Wearable Single-Enzyme-Based Energy-Harvesting and Self-Powered Biosensing Devices

ABSTRACT Developing flexible bioelectronics is essential to the realization of artificial intelligence devices and biomedical applications, such as wearables, but their potential is limited by sustainable energy supply. An enzymatic biofuel cell (BFC) is promising for power supply, but its use is limited by the challenges of incorporating multiple enzymes and rigid platforms. This paper shows the first example of screen-printable nanocomposite inks engineered for a single-enzyme-based energy-harvesting device and a self-powered biosensor driven by glucose on bioanode and biocathode. The anode ink is modified with naphthoquinone and multiwalled carbon nanotubes (MWCNTs), whereas the cathode ink is modified with Prussian blue/MWCNT hybrid before immobilizing with glucose oxidase. The flexible bioanode and the biocathode consume glucose. This BFC yields an open circuit voltage of 0.45 V and a maximum power density of 266 μW cm^{-2}. The wearable device coupled with a wireless portable system can convert chemical energy into electric energy and detect glucose in artificial sweat. The self-powered sensor can detect glucose concentrations up to 10 mM. Common interfering substances, including lactate, uric acid, ascorbic acid, and creatinine, have no effect on this self-powered biosensor. Additionally, the device can endure multiple mechanical deformations. New advances in ink development and flexible platforms enable a wide range of applications, including on-body electronics, self-sustainable applications, and smart fabrics.



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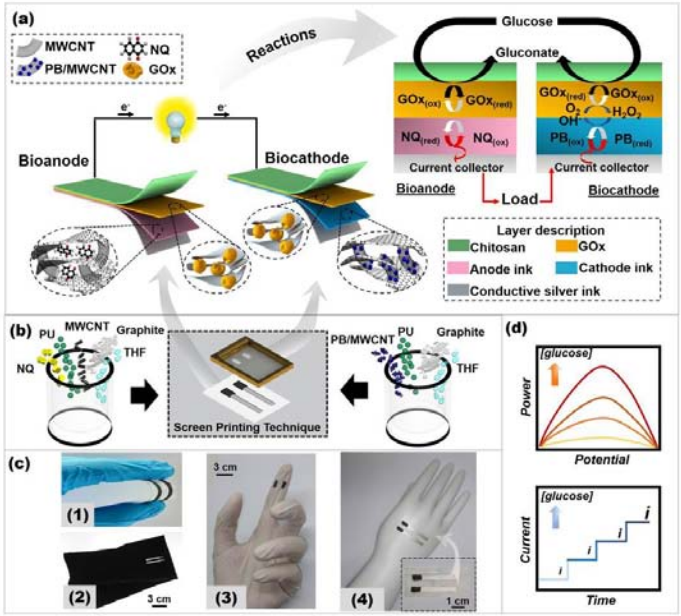

Fig. 1 The conceptual presentation of a screen-printed and flexible single-enzyme-based system for harvesting energy from glucose and self powered sensing glucose. **a** The components of a screen-printed glucose BFC along with redox reactions occurring on the bioanode and the bio cathode. **b** Preparation of the screen-printable inks for the anode and the cathode. **c** Photographs of a screen-printed glucose BFC on (1) PET, (2 a stretchable textile (arm sleeve), (3) a glove (fingertip), and (4) a stretchable epidermal tattoo attached to a hand model. **d** The working opera tion of a screen-printed glucose BFC on (top and bottom) energy-harvesting and self-powered sensing modes

Veenuttranon, K., Kaewpradub, K. and **Jeerapan, I.***, 2023. ***Nano-Micro Letters***, 15(1), p.85.

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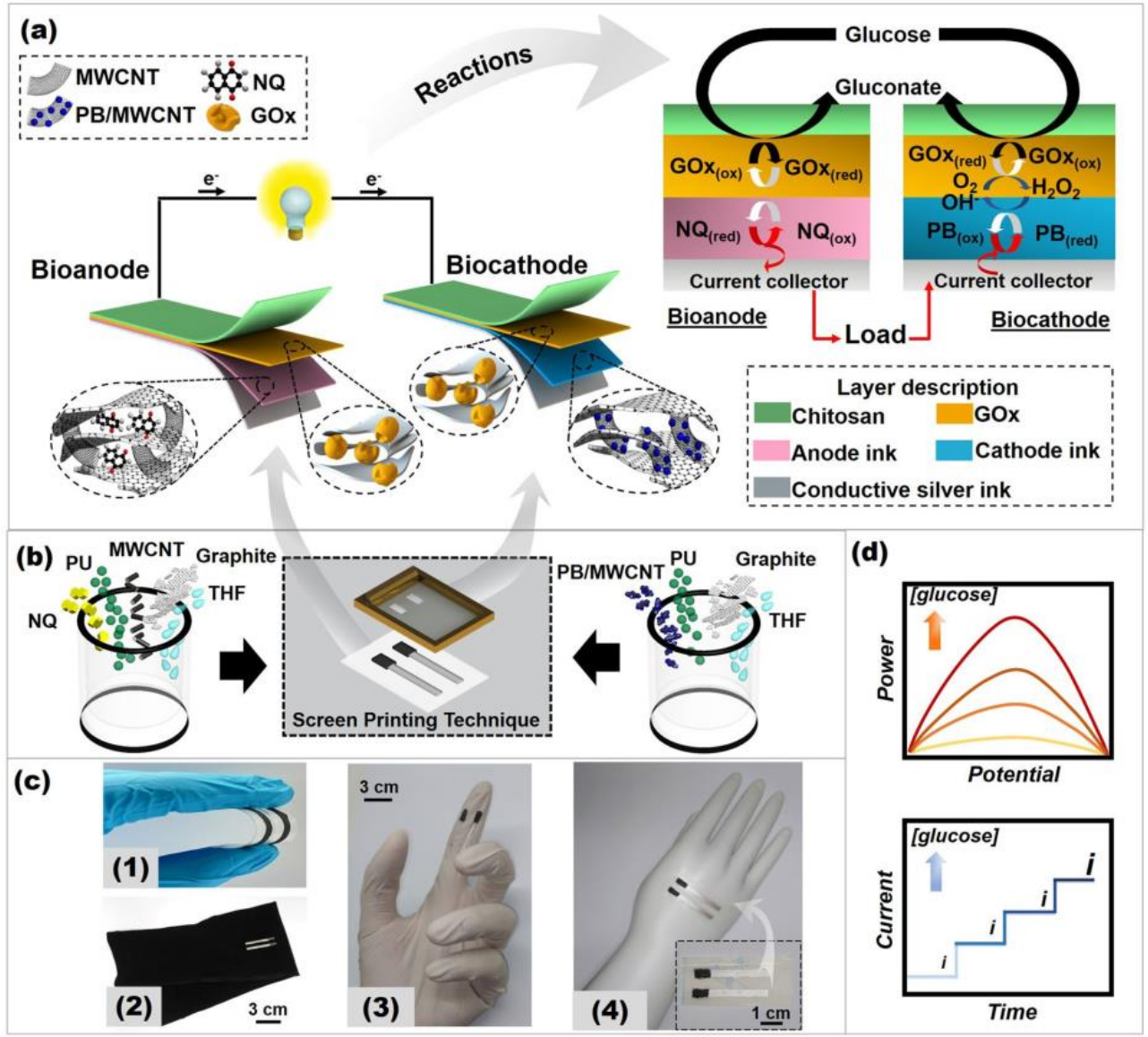

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Chemical Engineering Journal
Volume 485, 1 April 2024, 148898

A diaper-based printed sensing array for noninvasively and speedily detecting morphine and potassium ions

Natcha Rasitanon [a b], Warawut Sangsudcha [a], Itthipon Jeerapan [a b c 1]

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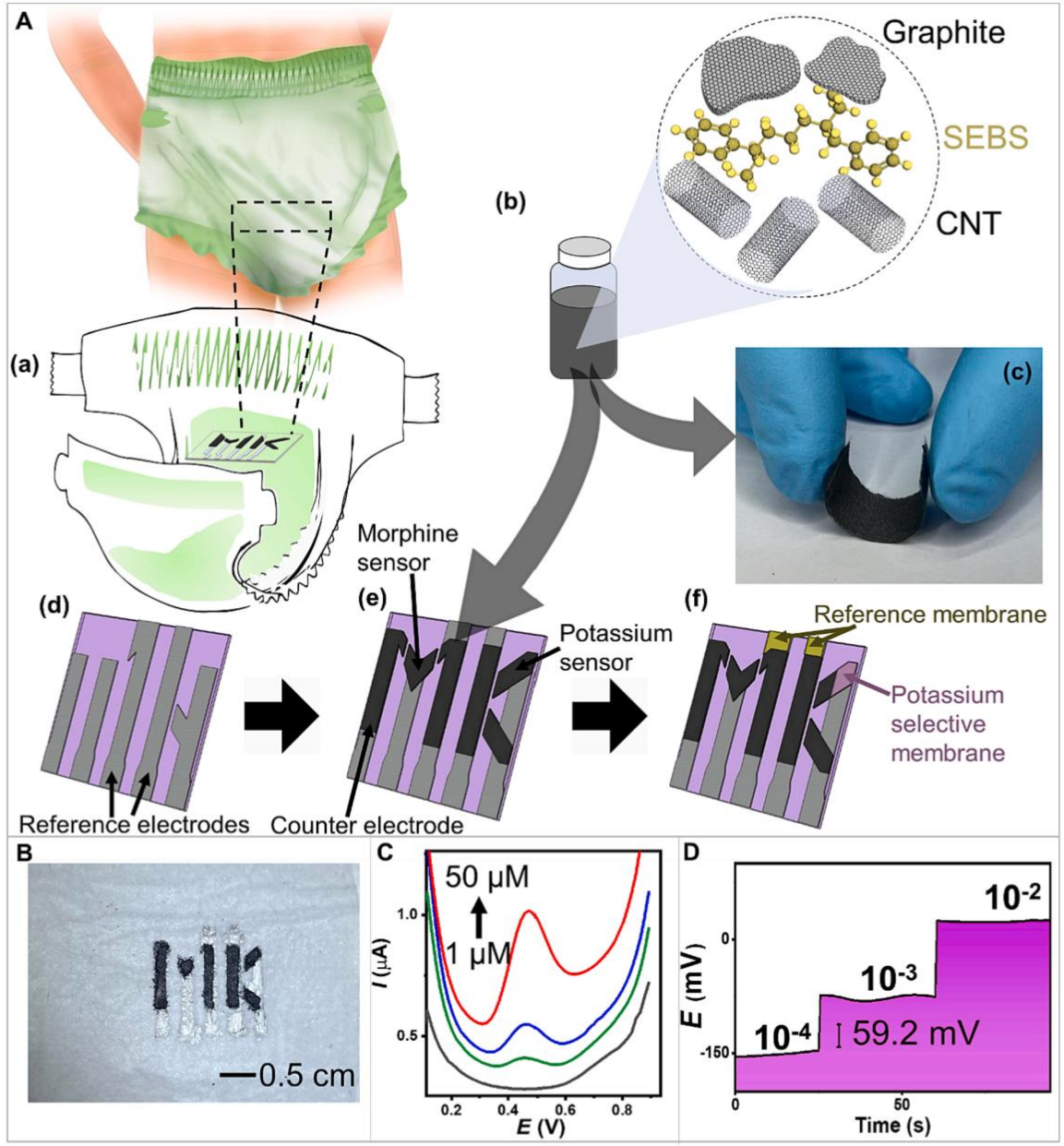

Fig. 1. Diaper-based morphine and potassium sensors. (A) A diaper device designed for developing morphine and potassium sensors, featuring: (a) Application of diaper-based FLEX-CNT to the patient, (b) Illustration of custom-made ink preparation, (c) Photos of customized FLEX-CNT ink on a flexible plastic sheet, (d-e) Printing of Ag/AgCl patterns and working and counter electrodes on a substrate, and (f) Drop casting of a reference cocktail as the reference electrode for sensors and the potassium-selective solution on the working electrode of the potassium sensor. (B) Photo of the diaper-embedded morphine and potassium sensor. (C) Square wave voltammetry (SWV) response performed with a screen-printed FLEX-CNT electrode, increasing the concentration of morphine in artificial urine from 1 μM to 50 μM. SWV conditions: step potential 15 mV, modulation amplitude 50 mV, frequency 5 Hz. (D) Potentiometric response of the potassium selective-membrane-based sensor.

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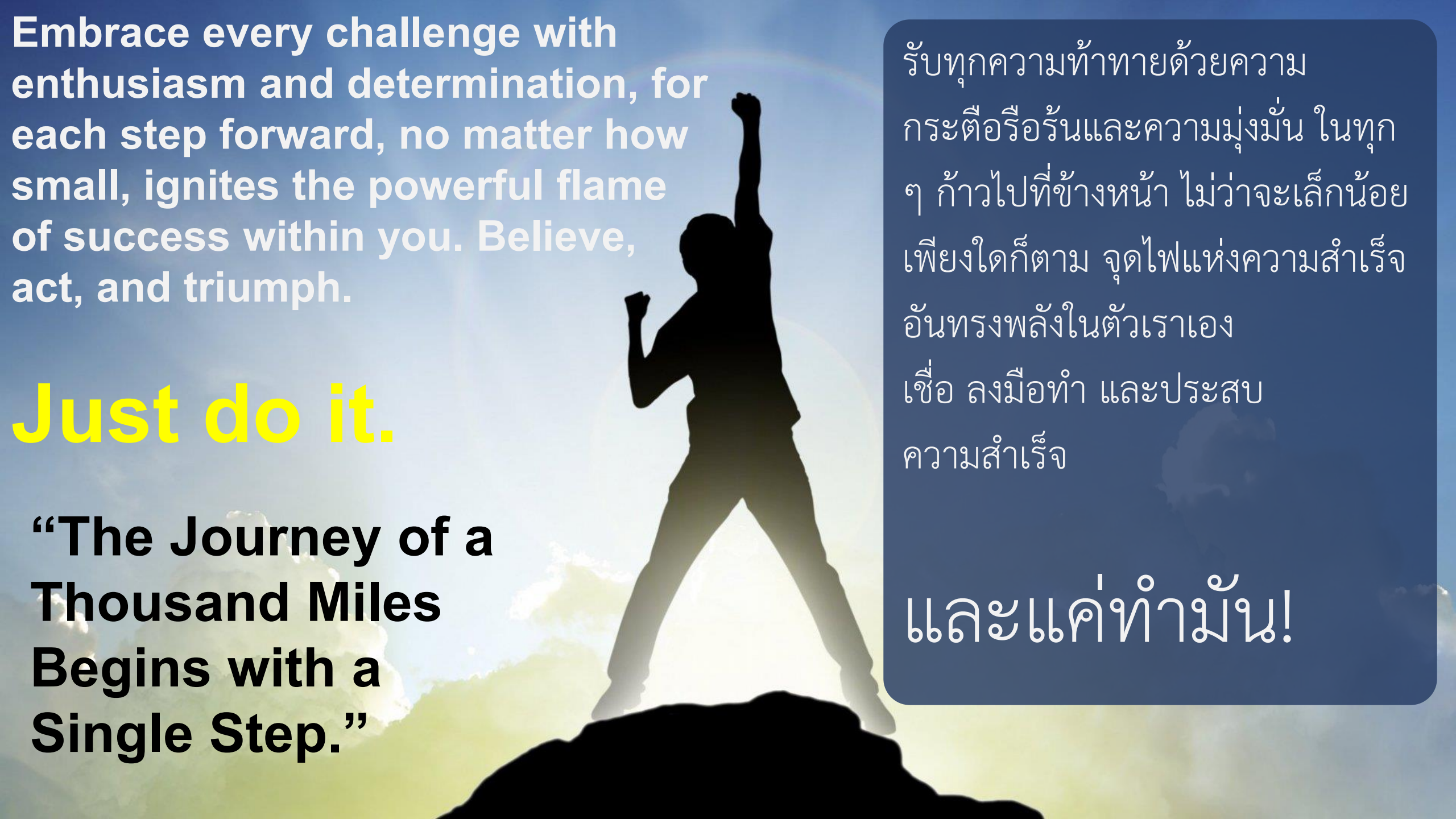
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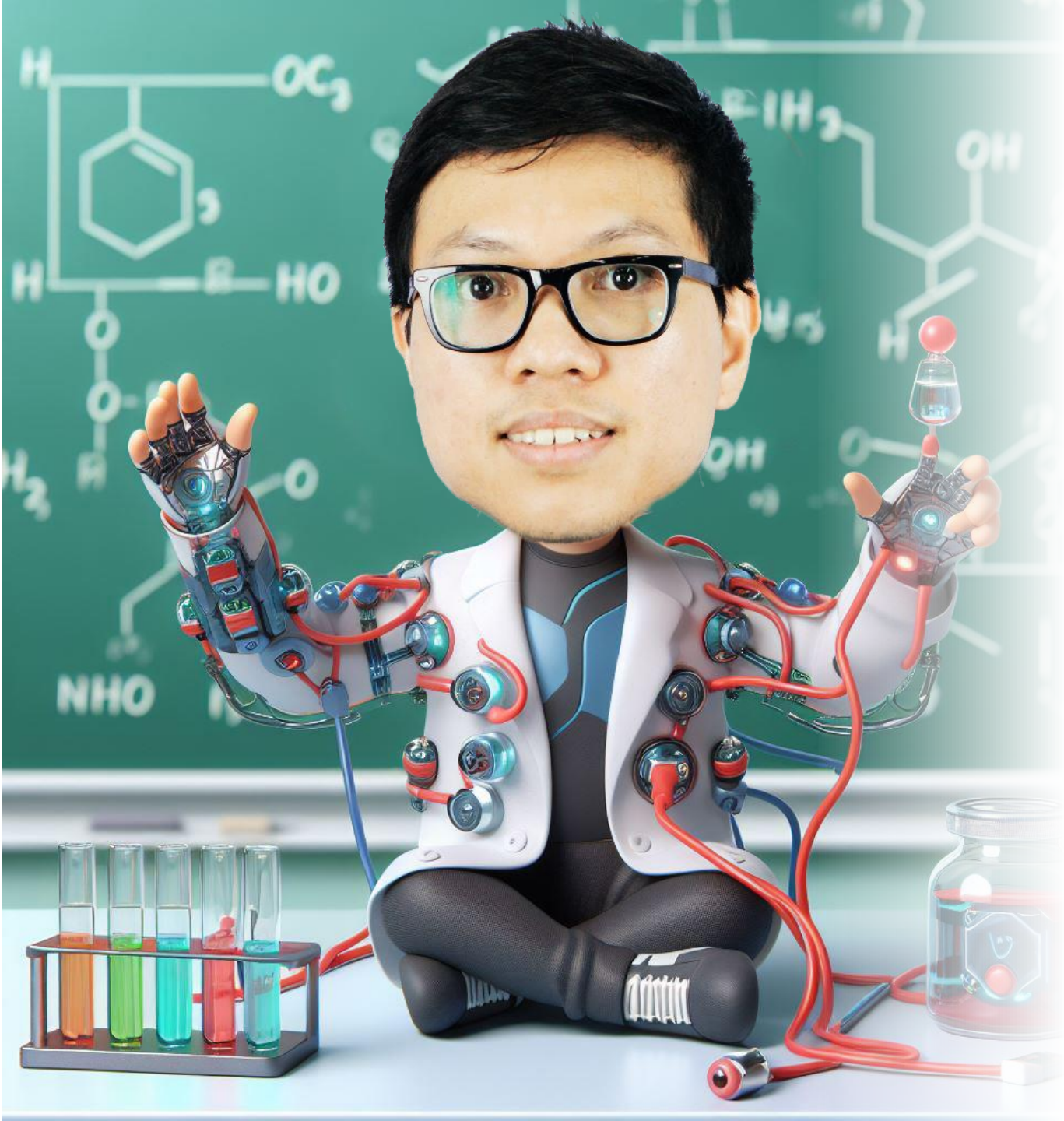

Electrochemistry for all

Q&A