



学汇百川 德济四海

科研菜鸟的进阶之路

读博以来的心得体会

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「01」课题调研及选择

「02」文献整理及学术写作



如何去选择课题

- 提出问题、解决问题的前置任务
- 一个好课题会让你事半功倍

2. 课题的选择几种方式：

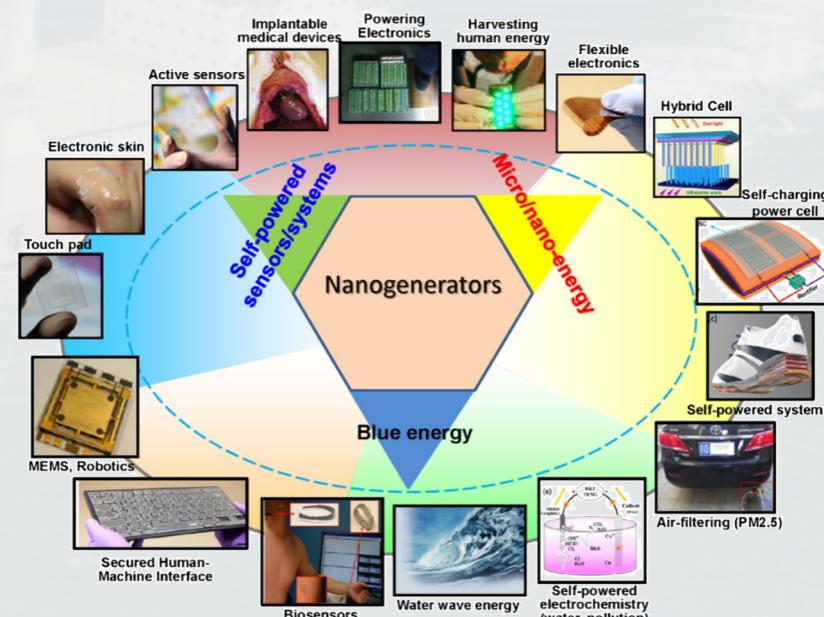
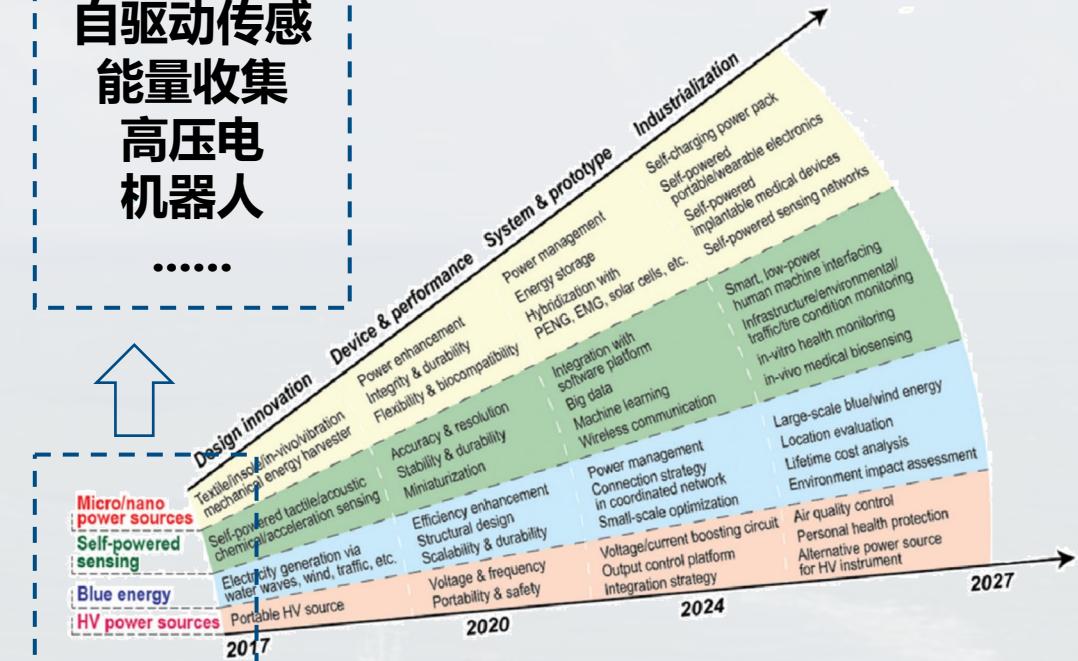
- 课题组现有项目
- 导师安排课题
- 研究生独立选题

3. 课题的选择几个原则：

- 考虑科学性与应用性：应用前景、科学问题
- 课题需最好具有连续性：一个题目可一直深挖下去，而不是“打一枪换一个地”
- 与专业相联系：船舶、海洋、海事.....
- 需提前了解课题组的研究基础，避免“空中楼阁”般的课题；
- 你做的是科研，而不是工程

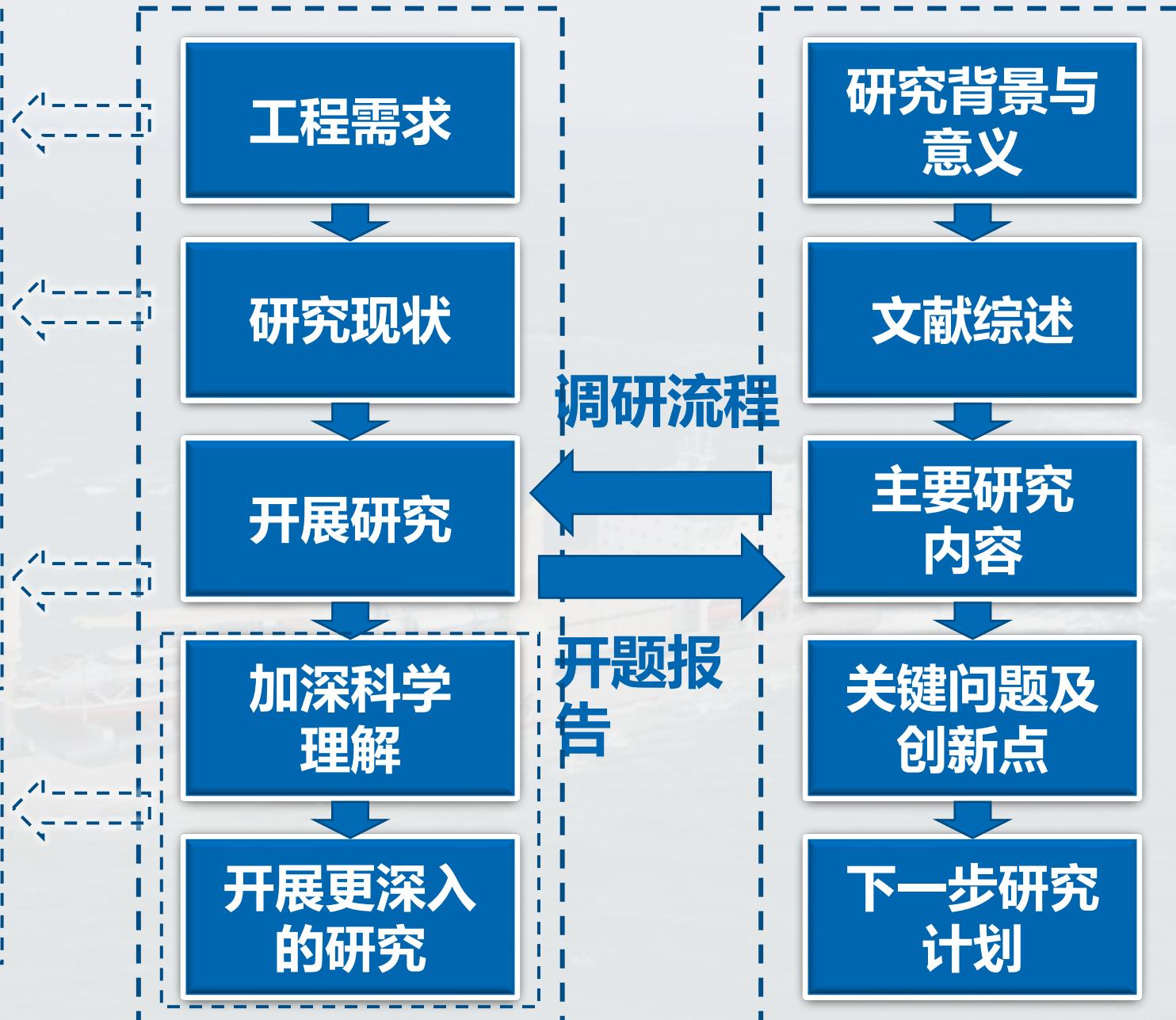
自驱动传感
能量收集
高压电
机器人

.....



如何去调研新课题

- 需求：哪些行业内存在哪些技术需求？？
- 必要性：这个技术问题真的是亟需解决的吗？？
- 现有的商业产品有哪些？？这些产品存在什么问题呢？？
- 国内外学术界为解决这个问题做了哪些学术研究？？他们解决了什么？？哪些问题还没有解决？？
- 其中的科学问题是什么
- 阅读相关学术论文，构思器件、设计实验、初步验证实验
- 实践（实验）结合理论（论文），会加深你对所研究的科学问题的理解，在不断的实验中就会找到新的创新点





可能会遇到的“坑”

1. “你的科学问题是什么？”

- 科学即反映人们对自然、社会、思维等的客观规律的分科的知识体系。所以科学问题，包括客观规律问题，知识体系等问题。



- 是什么 (What)
- 为什么 (Why)
- 怎么样 (How)



- 力学问题 ??
- 物理学问题 ??
- 化学问题 ??
- 数学问题 ??

.....



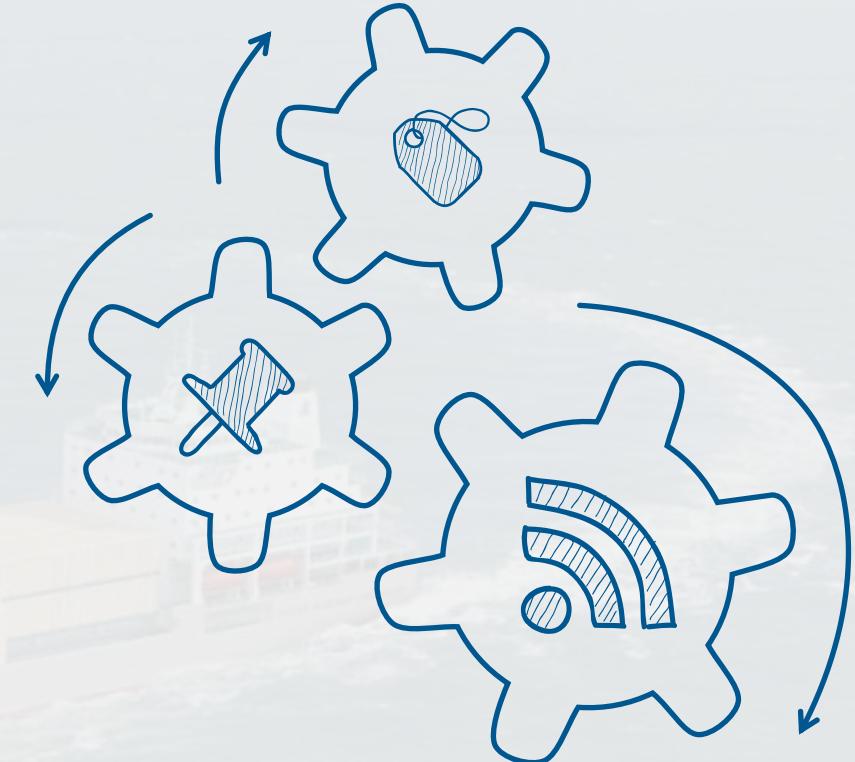
- Engineering is the purposeful use of science.

-工程是有目的地应用科学



可能会遇到的“坑”

- 1 | 调研过程可能会很枯燥，要沉住气，心态要平和；
- 2 | 调研过程中要有输出，PPT或者Word，可以以开题报告为模板进行调研；
- 3 | 按时与老师讨论、交流，避免方向跑偏，与老师交流的过程可以看成是与审稿人及答辩专家“博弈”的预演；
- 4 | 注重利用行业资源，多与行业内的专家交流，可大大节省调研；

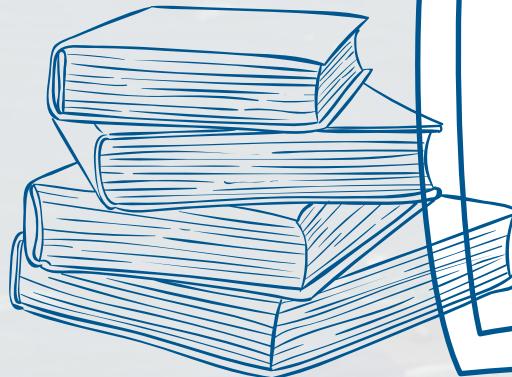




科研新手如何快速入门

方法

- 学会阅读文献：带着目的读文献、注重逻辑梳理；
- 学会设计实验：一环套一环；
- 学会搭建实验台
- 培养团队合作意识



工具

- 文献阅读：谷歌学术、校园网、知云文献翻译.....
- 实验材料：线性电机、3D打印机、数采.....
- 数据处理：Origin、PPT
- 模拟仿真：COMSOL
- Demo拍摄：相机、视频剪辑app.....



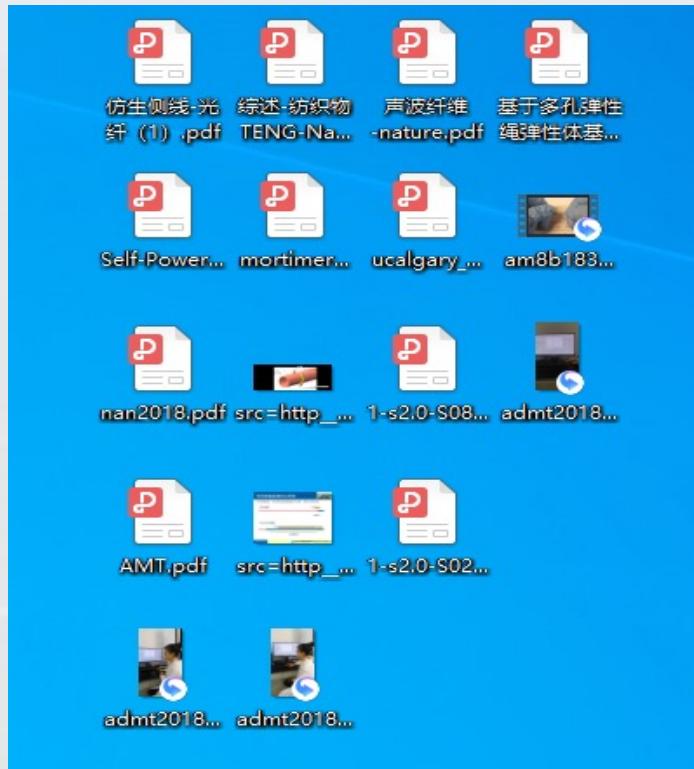


「01」课题调研及选择

「02」文献整理及学术写作



可借助相关文献整理软件，个人推荐Mendeley软件，免费、上手简单
<https://www.mendeley.com/download-reference-manager/windows>

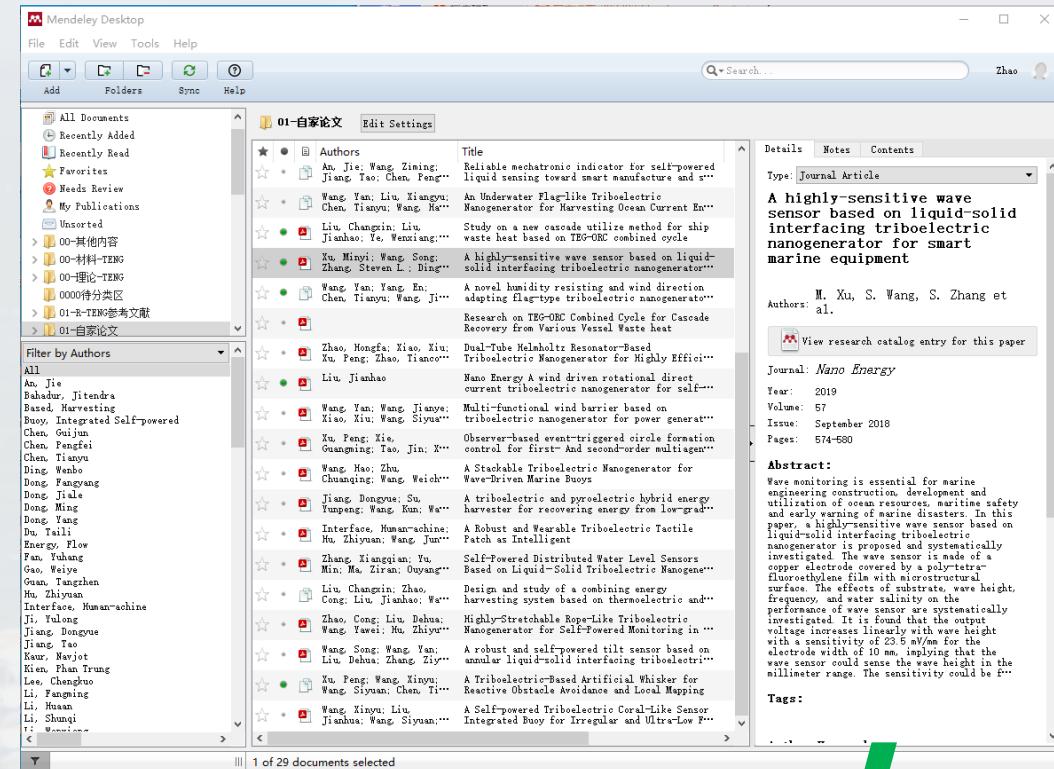


杂乱、无序的文献分类



为什么要养成良好的文献整理习惯呢？

1. 方便随时找到自己想要读的文献，避免将时间浪费在各个盘中找文章中
2. 在文章撰写过程中，尤其是论文撰写过程中方便Word文档插入文献



有序的文献分类





论文写作

➤ 响亮的题目：概括性强，词数越少越好

Accurate (准确)

Brief (简练)

Clear (清楚)

Declarative (说理清晰)

Engaged (吸引力)

总结的TENG领域题目几种常见的形式：

- A+adj(表示器件主要优势的形容词，1-3个) +n(TENG or sensor) for/towards/as + n(用途、场景)
- n + triggered/enabled+adj+n + using/via/with Triboelectric Nanogenerator
- A + n(sensor or novel material) +based (on) Triboelectric Nanogenerator for/towards+ n(用途、场景)

ARTICLE

<https://doi.org/10.1038/s41467-019-10433-4>

OPEN

A bionic stretchable nanogenerator for underwater sensing and energy harvesting

Yang Zou^{1,2,3,7}, Puchuan Tan^{1,3,7}, Bojing Shi^{1,2,7}, Han Ouyang^{1,3}, Dongjie Jiang^{1,3}, Zhuo Liu^{1,2}, Hu Li^{1,2}, Min Yu⁴, Chan Wang^{1,3}, Xuecheng Qu^{1,3}, Luming Zhao^{1,3}, Yubo Fan^{2,5}, Zhong Lin Wang^{1,3,6} & Zhou Li^{1,3}

SCIENCE ADVANCES | RESEARCH ARTICLE

APPLIED SCIENCES AND ENGINEERING

Eye motion triggered self-powered mechanosensational communication system using triboelectric nanogenerator

Xianjie Pu,^{1*} Hengyu Guo,^{1,2*} Jie Chen,¹ Xue Wang,¹ Yi Xi,¹ Chenguo Hu,^{1†} Zhong Lin Wang^{2‡}

Stretchable, Self-Healing, and Skin-Mounted Active Sensor for Multipoint Muscle Function Assessment

Chan Wang,[#] Xuecheng Qu,[#] Qiang Zheng,[#] Ying Liu, Puchuan Tan, Bojing Shi, Han Ouyang, Shengyu Chao, Yang Zou, Chaochao Zhao, Zhuo Liu, Yusheng Li,^{*} and Zhou Li^{*}



Cite This: ACS Nano 2021, 15, 10130–10140



Read Online

A Wrinkled PEDOT:PSS Film Based Stretchable and Transparent Triboelectric Nanogenerator for Wearable Energy Harvesters and Active Motion Sensors

Zhen Wen,^{*} Yanqin Yang, Na Sun, Gengfei Li, Yina Liu, Chen Chen, Jihong Shi, Lingjie Xie, Hongxue Jiang, Dequan Bao, Qiqi Zhuo, and Xuhui Sun^{*}



论文写作

➤ 协调的配色

1. 模仿别人论文的配色

2. 学会用配色网站

几个好用的配色网站

- <https://color.adobe.com/zh/create/color-wheel>
- <https://colorhunt.co/>
- <https://brandcolors.net/>
- <https://uigradients.com/#Mango>
- <https://www.sioe.cn/yingyong/yanse-rgb-16/>

The diagram illustrates the S-TENG device. Part (a) shows the transformation from seaweed to the S-TENG device. Part (b) shows a cross-section of the device with layers: Top layer (1cm), FEP, ink-coated PET, bottom layer (1cm). Part (c) shows the working principle: three states of the device with conductive ink (green) and PET (orange) layers. Part (d) shows three applications: oceanographic buoys, coastal power station, and coastal application.

This figure consists of five subplots. Subplot (a) shows a 3D surface plot of wave height (mm) over time (s) and wave direction. Subplots (b) through (e) show current signals (mA) versus wave height (mm) for Sensor 1 at different frequencies (0.65Hz, 0.75Hz, 0.85Hz, 0.95Hz). Each subplot includes a linear regression fit and error bars for 'Fitting' and 'Actual' data.

方案	RGB
R_ggplot2_Set1	228,26,28 55,126,184 77,175,74 152,78,163 255,127,0 255,255,51 166,86,40 247,129,191 153,153,153
R_ggplot2_Set2	102,194,165 252,141,98 141,160,203 231,138,195 166,216,84 255,217,47 229,196,148 179,179,179
R_ggplot2_Set3	255,108,145 188,157,0 0,187,87 0,184,229 205,121,255
Tableau 10 Medium	96,157,202 255,150,65 56,194,93 255,91,78 184,135,195 182,115,101 254,144,194 164,160,155 210,204,90
Tableau 10	0,118,174 255,116,0 0,161,59 239,0,0 158,99,181 152,82,71 246,110,184 127,124,119 194,189,44
Python seaborn heat	246,112,136 206,143,49 150,163,49 50,177,101 53,172,164 56,167,208 163,140,244 244,97,221
Python seaborn default	76,114,176 85,168,104 196,78,82 129,114,178 204,185,116 100,181,205
D3.js	94,156,198 255,125,11 44,160,44 214,39,40 148,103,189 140,86,75

Adobe Color interface. It features a color wheel with color names A through E, a color palette bar, and a color palette preview area with hex codes for each color.

Color Hunt interface showing palettes for various brands: 500px (red, green, blue), About.me (teal, orange, yellow), Adidas (purple, red, orange, yellow, green), Adobe (red, orange, yellow, green, blue), Adyen (green, dark blue), and Adzuna (green, light green).

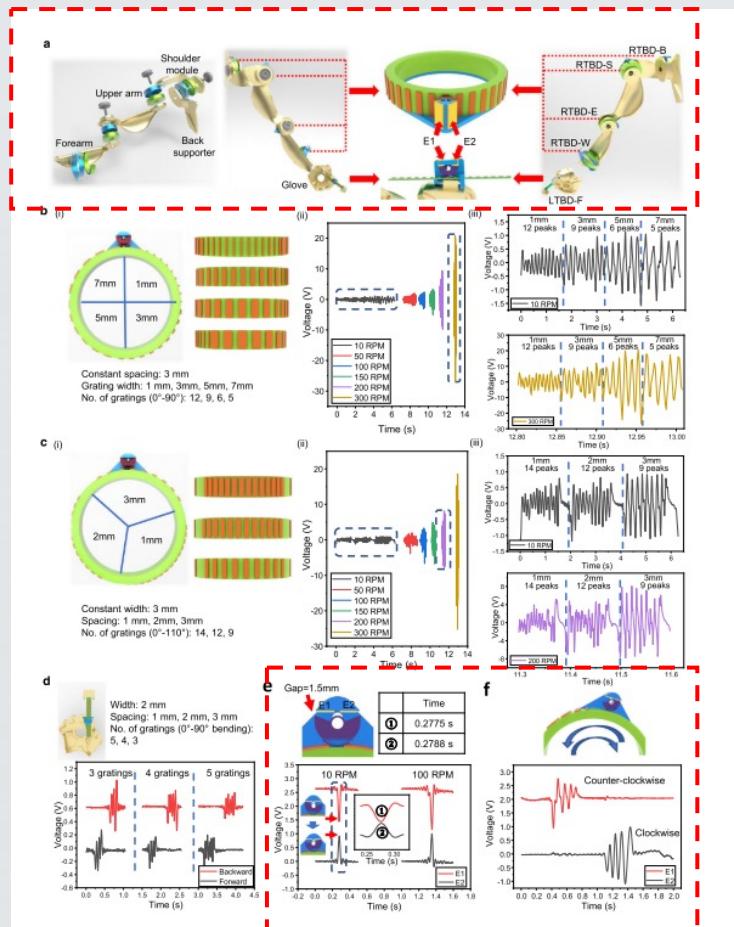
BrandColors interface showing collections for 500px, About.me, Adidas, Adobe, Adyen, and Adzuna, each with a color palette and hex code.



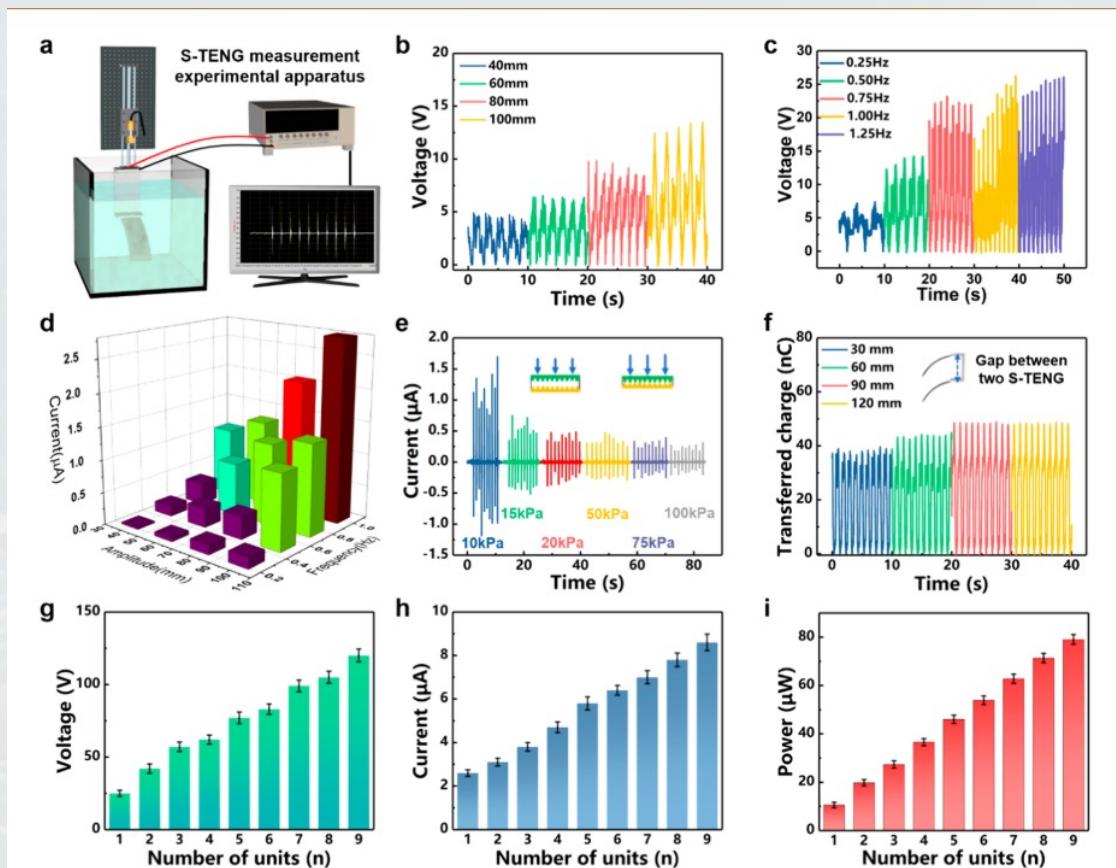
论文写作

➤ 漂亮的数据图

1. 图文并茂，插图配数据图可方便读者理解你的数据



2. 避免数据图形式单一，一篇文章不应该只有波形图、还要有折线图、柱状图等，使数据图看起更丰富、美观



新手可能遇见的“坑”

1. “道理我懂，可是这五张大图究竟怎么设计？”
2. 我从Origin导出的数据图不清晰？
3. 大图设计完了，写论文时发现无法衔接起来
4. demo拍完了，发现不知道怎么放到大图里？



论文写作

➤ 严谨的学术写法

1.摘要 (Abstract) : 独立、自明，不读全文也能知道这篇工作做了什么。

2.引言 (Introduction) : 像剥洋葱一样由大到小，层层递进，逻辑强

Part 1 : 介绍一下工作面向大的领域，该领域目前存在什么问题。以及现在有哪些解决方案，这些方案有哪些问题？

Part 2 : 综述前人做了哪些研究，引出自己的创新点；

注意：不能只介绍不评论，综述完之后一定要得出你自己的结论；

Part 3: 引出自己的研究工作；

3.研究内容(Results and Discussion) : 要用客观的表达方式，描述加解释，尽量不要带感情色彩的词语，例如 “Wonderful” “ Excellent” “ Good” “ Bad” 等等；注意前后文时态要一致；避免使用口语的表达方式“ What's more” 等。

4.结论 (Conclusion) : 注意不要和摘要重复了，要换一种方式去表达。

5.Experimental Section : 要写细，要让别人可以按照你的方法去重复实验



论文写作

当前版本：翻译助手 V2.0

大连接大学图书馆 个人登录

CNKI 学术翻译 翻译助手

自动检测目标语言 翻译 脚本

弹性系数 × elastic coefficient

5/500 复制 | 剪贴

词典 双语例句 英文例句 相关文档

学科领域：全部(40) 宏观经济管理与可持续发展(10) 公路与水路运输(10) 工业经济(9) 电力工业(8) 数学(8) 交通运输经济(5) 石油天然气工业(5)
农业经济(5) 旅游(4) 财政与税收(4) 经济体制改革(4) 计算机软件及计算机应用(4) 人才学与劳动科学(4) 环境科学与资源利用(4) 外国语言文字(3)

专业词典 (来源于：专科辞典、百科全书、双语词典、工具手册等工具书)

弹性系数

elastic coefficient coefficient of elasticity modulus of elasticity elastic modulus
来源《汉英社会科学大词典》 来源《英汉视读词典》 来源《汉英美汉辞典辞海词典》 来源《英汉双向生物化学词典》
elasticity coefficient elasticity coefficient resilience factor elasticity coefficient (e.c.)
来源《英汉航空航天辞典》 来源《汉英汽车技术词典》 来源《英汉皮革和毛皮工业常用词典》 来源《英汉科技大词典》

学术词典 (来源于：期刊论文、博硕论文、会议论文、图书等各类文献资源)

弹性系数

elastic coefficient (219) elasticity coefficient (217) elastic constants (23) flexible coefficient (15)
modulus of elasticity (14) elasticity coefficients (11) coefficient of resilience (11) flexibility coefficient (9)

相关文献

- Matrix of Elastic Coefficients of Laminated Cores of Electric Machines
- Nonlinear oscillators with state variable damping and elastic coefficients
- Shear Elastic Coefficient of Normal and Fibrinogen-Deficient Clotting Plasma Obtained with a Sphere-Motion-Based Acoustic-Radiation-Force Approach.
- Effect of the elastic coefficient heterogeneity and crystallography on the grain growth stagnation
- Injection molding temperature dependence of elastic coefficients obtained using three-point bending tests to ascertain thermoplastic polymer coefficients
- Elastic Coefficients of β -HMX as Functions of Pressure and Temperature from Molecular Dynamics
- Softening of Shear Elastic Coefficients in Shape Memory Alloys Near the Martensitic Transition: A Study by Laser-Based Resonant Ultrasound Spectroscopy
- Spatial and Temporal Heterogeneity Analysis of Water Conservation in Beijing-Tianjin-Hebei Urban Agglomeration Based on the Geodetector and Spatial Elastic Coefficient Trajectory Models.
- Microsystem Technologies: New Findings from Northeastern University in the Area of Microsystem Technologies Reported (A study on the elastic coefficients of setback micro-springs for a MEMS safety and arming device)

Electron Devices Researchers at University of Central Florida Report New Data on Electron Devices (Inadequacy of third-order elastic coefficients for Predicting Nonlinearity in Highly N-type-doped Silicon Resonators)

Journal | [J] Crystals Volume 10, Issue 12, 2020. PP 1123-1123

MT β -HMX的弹性系数作为压力和温度的函数来自分子动力学

Elastic Coefficients of β -HMX as Functions of Pressure and Temperature from Molecular Dynamics

Author: Pereverzev Andrey; Sewell Tommy

Affiliations: Department of Chemistry, University of Missouri, Columbia, MO 65211, USA

DOI: 10.3390/CRYST10121123

Sources Multidisciplinary Digital Pub...

摘要 / Abstract

MT 利用P21/n空间群模型，从分子力学的角度计算了B-1,3,5,7-四硝基-1,3,5,7-四氮辛烷(β -HMX)在10~4~30GPa, 300~1100K温度范围内的等温二阶弹性刚度张量和各向同性模量。弹性刚度张量分量计算为柯西应力张量分量相对于线应变分量的导数。通过在给定的压力和温度下对平衡的 β -HMX晶体施加小规模的有限应变，并利用应变细胞的平衡应力张量得到应力对应变的导数。对这些导数进行了数值计算。对于固定温度，弹性系数随着压力的增加而大幅度增加，而对于固定压力，弹性系数按照物理预期随着温度的增加而减小。尽可能提供与以往实验和计算结果的比较。
close

原文 The isothermal second-order elastic stiffness tensor and isotropic moduli of B-1,3,5,7-tetranitro-1,3,5,7-tetrazocane (β -HMX) were calculated, using the P21/n space group convention, from molecular dynamics for hydrostatic pressures ranging from 10~4~30 GPa and temperatures ranging from 300 to 1100 K using a validated all-atom flexible-molecule force field. The elastic stiffness tensor components were calculated as derivatives of the Cauchy stress tensor components with respect to linear strain components. These derivatives were evaluated numerically by imposing small, prescribed finite strains on the equilibrated β -HMX crystal at a given pressure and temperature and using the equilibrium stress tensors of the strained cells to obtain the derivatives of stress with respect to strain. For a fixed temperature, the elastic coefficients increase substantially with increasing pressure, whereas, for a fixed pressure, the elastic coefficients decrease as temperature increases, in accordance with physical expectations. Comparisons to previous experimental and computational results are provided where possible.
close

关键词 / Keywords

MT HMX; 弹性性质; 分子动力学
原文 HMX; elastic properties; molecular dynamics

核心评价 / Indexed by
SCI; CAS; Scopus; WAJCI; INSPEC;

Related articles / 相关文献

Similar articles Articles by author Articles by affiliation Keywords analysis

CNKI学术翻译:<https://dict.cnki.net/index#>



准确的词语搭配

<https://www.linggle.com/>

<https://udn.linggle.com/?q=in+the+afternoon>

The screenshot shows the Linggle search interface with the word "disc" typed into the search bar. Below the search bar, a list of search results is displayed, each with a term and its Chinese translation:

Term	Definition / Translation
discourage n from n	阻止/防止/打消
discuss n	討論/論述/談
discover that	發現/發覺
discover n	發現/找到
discuss wh-to-inf	討論/探討
discontinue -ing	停止/中止
disclose wh	透露
discover wh-to-inf	發現
disclose that	透露
discuss wh	討論

帮助你正确地搭配英语词组！避免犯相关语法错误！

linggle 10¹² v. an/a adj. role

play an important role	14 %	834,402	
plays an important role	7 %	460,872	
play a key role	6 %	374,534	
played an important role	4 %	280,208	
play a major role	4 %	269,986	
played a key role	4 %	241,735	
play a significant role	3 %	202,856	
played a major role	3 %	200,750	
plays a key role	3 %	192,876	
play a vital role	2 %	160,451	

linggle 10¹² neural/neuro

neural	42 %	3,048,727	
neural	42 %	3,048,727	
neuro	7 %	514,984	
neuro	7 %	514,984	



学汇百川 德济四海

A large cargo ship with multiple decks and shipping containers is sailing on a choppy blue sea under a clear sky.

Thank You !