北京工商大學
Beijing Technology and Business University

经学校申报、专家组考察评估、市领导研究，我校被定位为北京市重点建设的高水平研究型大学，学校的教育事业发展进入了新阶段。学校将以此为契机，以高水平科研平台建设、科研项目申报、科研成果获批为导向，提升科研创新能力，推动科技成果转化，为实现具有商科、轻工和食品特色的世界一流大学不懈努力，力争为国家和首都经济社会发展做出新的更大贡献。

为激发全校师生的科研热情，展示学校各类高水平科研成果，科学技术处、党委宣传部推出《学术简报》栏目，在栏目中推送各学科的最新科研成果，以便师生全面、准确了解各学科科研发展状况，促进各学科间相互交流与合作，推动学校整体科研工作水平的整体、稳步提升。

数学与统计学院李陶副教授在 NAUTUR 子刊发表高水平学术论文

李陶副教授以通讯作者身份在 Nature 子刊，国际知名期刊《Scientific Reports》上发表了关于多体量子态纠缠判定的学术文章《Multipartite entanglement criterion via generalized local uncertainty relations》。量子信息是近年来热门的研究领域，它是将传统的信息理论与量子力学相结合产生的新学科。在量子信息中，纠缠的量子态被认为是最重要的量子资源之一，如何判断一个未知量子态是否是纠缠的对量子信息的应用十分关键。特别地，在多体量子系统中给出纠缠量子态的判定方法更加复杂。该文章中通过局域

不确定性关系的方法构造出一种判断多体量子态纠缠的方法，该方法不仅在理论上可以检测出更多的量子纠缠，在实验上也可以得以实现。

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Multipartite entanglement criterion via generalized local uncertainty relations

Jia-Bin Zhang[1], Tao Li[2]✉, Qing-Hua Zhang[1], Shao-Ming Fei[1] & Zhi-Xi Wang[1]

We study the detection of multipartite entanglement based on the generalized local uncertainty relations. A sufficient criterion for the entanglement of four-partite quantum systems is presented in terms of the local uncertainty relations. Detailed examples are given to illustrate the advantages of our criterion. The approach is generalized to general multipartite entanglement cases.

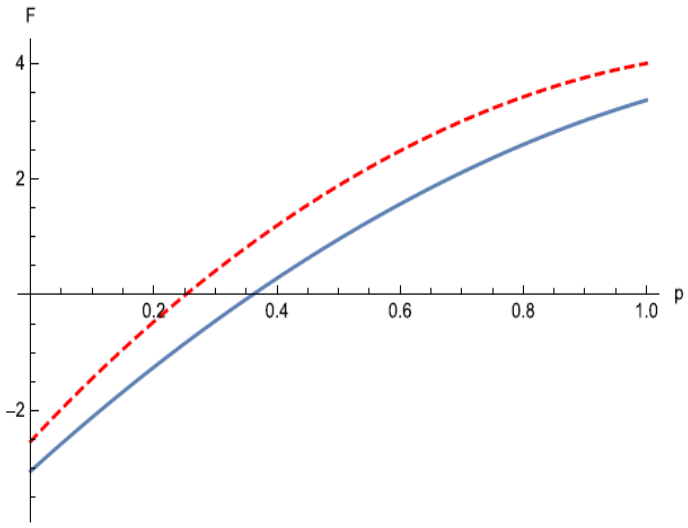


Figure 1. For the four-partite W state mixed with the white noise ρ_1. The the blue line stands for $F_{\rho_1}^{123|4}$ and the red dash line stands for $F_{\rho_1}^{12|34}$ in Theorem 1. We can see that when $p \leq 0.3605$, state ρ_1 violates one of the inequalities (4), hence ρ_1 is entangled for $p \leq 0.3605$.

Competing interests

The authors declare no competing interests.

Additional information

Correspondence and requests for materials should be addressed to T.L.

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数学与统计学院王家赠副教授于物理领国际知名期刊发表高水平学术论文

王家赠副教授以第一作者身份在美国物理学会国际知名期刊《PHYSICAL REVIEW E》发表关于生物细胞膜电压问题的研究论文《Characterizing the voltage fluctuations driven by a cluster of ligand-gated channels》。该文章介绍了由一组配体门控通道驱动的电压波动的特性。然后解析得到电压噪声的功率谱，证明其具有$1/\omega^4$-形式。其机制在于电压波动的随机性弱于通道（电导）噪声，可用 Ornstein-Ulenbeck 过程近似描述。

PHYSICAL REVIEW E **103**, 052401 (2021)

Characterizing the voltage fluctuations driven by a cluster of ligand-gated channels

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In this paper we present the properties of the voltage fluctuations driven by a cluster of ligand-gated channels. First, the second-order moment of the voltage is expressed in form of the integrated resistance and the random force. Then the power spectrum of the voltage noise is obtained analytically, and it is proved to have the $1/\omega^4$-form. Its mechanism lies in that the randomness of the voltage fluctuation is weaker than channel (conductance) noise, which can be approximately described by the Ornstein-Ulenbeck process.

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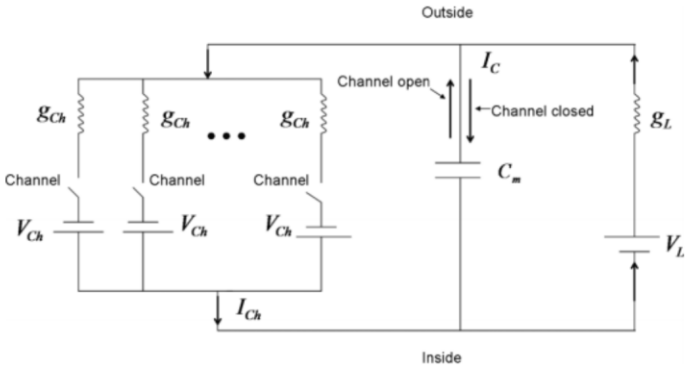


FIG. 1. The equivalent electric circuit of the system. Especially note that the reversal potentials V_{Ch} of the postsynaptic currents may be positive or negative, depending on the type of the synapse, so the battery V_{Ch} (accordingly the current I_{Ch}) may has different directions.

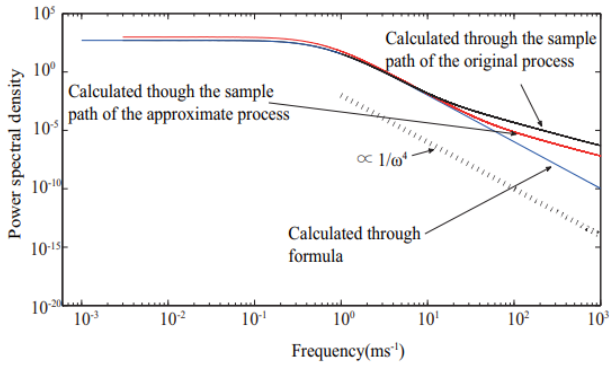
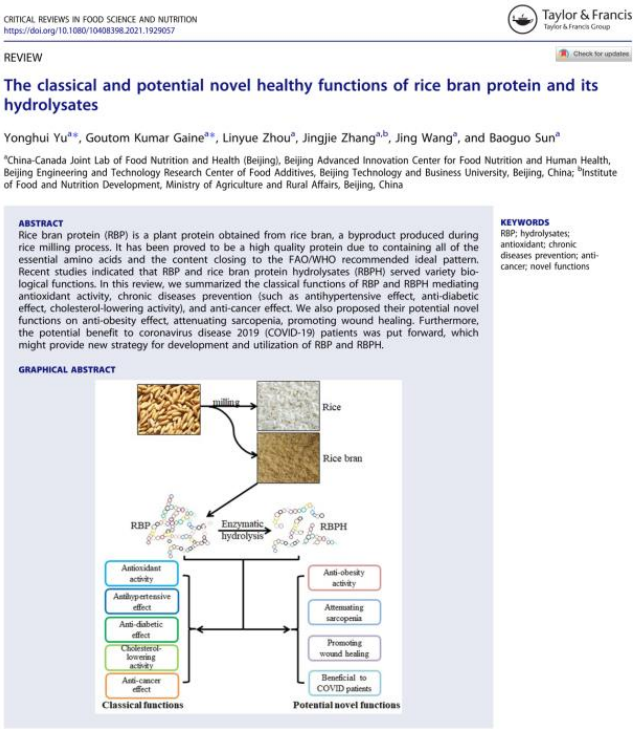


FIG. 2. The three kinds of power spectra calculated from three methods respectively. The values of other parameters are $C_m = 0.01\ \mathrm{pF}/\mu\mathrm{m}^2 \times 6\ \mu\mathrm{m}^2$, $V_L = -54.4$ mV, $V_{Ch} = 0$ mV, $k^+ = 0.01$, $k^- = 1$, and $N = 30$.

食品与健康学院王静教授团队在《Critical Reviews in Food Science and Nutrition》在线发表米糠蛋白及其水解产物的传统和新型健康功能的综述文章

米糠作为大米加工过程中的副产物，富含脂类、蛋白质、维生素、矿物质及膳食纤维等营养成分。米糠蛋白中必需氨基酸种类齐全，且含量接近于FAO/WHO推荐的氨基酸标准模式，易于被机体吸收与利用，是一种较为优质的植物蛋白。但米糠蛋白具有聚合度高、不易溶解等特点，而水解是增加其溶解性、提高利用率的有效手段。近年来研究发现米糠蛋白及其水解产物具有多种生物学功能，本文综述了米糠蛋白及其水解产物在抗氧化、降血压、调

节血糖、降血脂及抗肿瘤等方面的传统健康功能；同时阐述了其在预防肥胖、防治肌少症、促进创面愈合甚至对 COVID-19 患者潜在的新型保健功能，为米糠蛋白及其水解产物相关产品的开发和利用提供新思路。



CRITICAL REVIEWS IN FOOD SCIENCE AND NUTRITION
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REVIEW

The classical and potential novel healthy functions of rice bran protein and its hydrolysates

Yonghui Yu[a*], Goutom Kumar Gaine[a*], Linyue Zhou[a], Jingjie Zhang[a,b], Jing Wang[a], and Baoguo Sun[a]

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ABSTRACT

Rice bran protein (RBP) is a plant protein obtained from rice bran, a byproduct produced during rice milling process. It has been proved to be a high quality protein due to containing all of the essential amino acids and the content closing to the FAO/WHO recommended ideal pattern. Recent studies indicated that RBP and rice bran protein hydrolysates (RBPH) served variety biological functions. In this review, we summarized the classical functions of RBP and RBPH mediating antioxidant activity, chronic diseases prevention (such as antihypertensive effect, anti-diabetic effect, cholesterol-lowering activity), and anti-cancer effect. We also proposed their potential novel functions on anti-obesity effect, attenuating sarcopenia, promoting wound healing. Furthermore, the potential benefit to coronavirus disease 2019 (COVID-19) patients was put forward, which might provide new strategy for development and utilization of RBP and RBPH.

KEYWORDS

RBP; hydrolysates; antioxidant; chronic diseases prevention; anti-cancer; novel functions

GRAPHICAL ABSTRACT

资助信息：

该项目由北京市科技新星计划课题（Z181100006218043）、北京市自然科学基金面上项目（7172210）和国家自然科学基金面上项目（81471873）资助。

原文链接：

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食品与健康学院王静教授团队在《Trends in Food Science and Technology》在线发表 miRNA—介导营养素发挥生物学功能新媒介的综述文章

微小 RNA（microRNA, miRNA）是 1993 年首次在模式动物秀丽线虫中被发现的一类短链非编码 RNA，随后的研究发现 miRNA 广泛分布于真核生物中，且在进化上具有高度保守性。截止目前已发现的成熟 miRNAs 多达 48860 种，其中人体中发现的成熟 miRNAs 约为 2654 种（数据来源于 miRBase V22.0），这些成熟 miRNAs 参与基因转录后调控，尤其在抑制蛋白翻译方面发挥重要的作用。

近年来的研究也发现，食物中营养成分如碳水化合物、蛋白质、脂类、维生素、矿物质和膳食纤维等同样具有调控 miRNA 表达的作用，而膳食营养成分调节 miRNA 表达进而参与机体健康防控的分子机制，成为当前研究的热点。本文系统地总结了食物营养成分调控 miRNA 表达的研究进展，阐述了食物营养成分通过改变机体 miRNA 表达，进而在干细胞分化、胚胎发育、炎症反应调控、肝脏代谢、心脑血管疾病防控、肠道健康维持、骨骼和肌肉健康防护以及肿瘤发生等过程中的关键作用。因此， miRNAs 可能是营养成分调节生物学功能的潜在中间媒介，在调节生理功能方面发挥着不可替代的作用，为揭示营养干预防控疾病的分子机制提供了新方向。

Trends in Food Science & Technology xxx (xxxx) 1–9

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MicroRNAs: The novel mediators for nutrient-modulating biological functions

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ARTICLE INFO

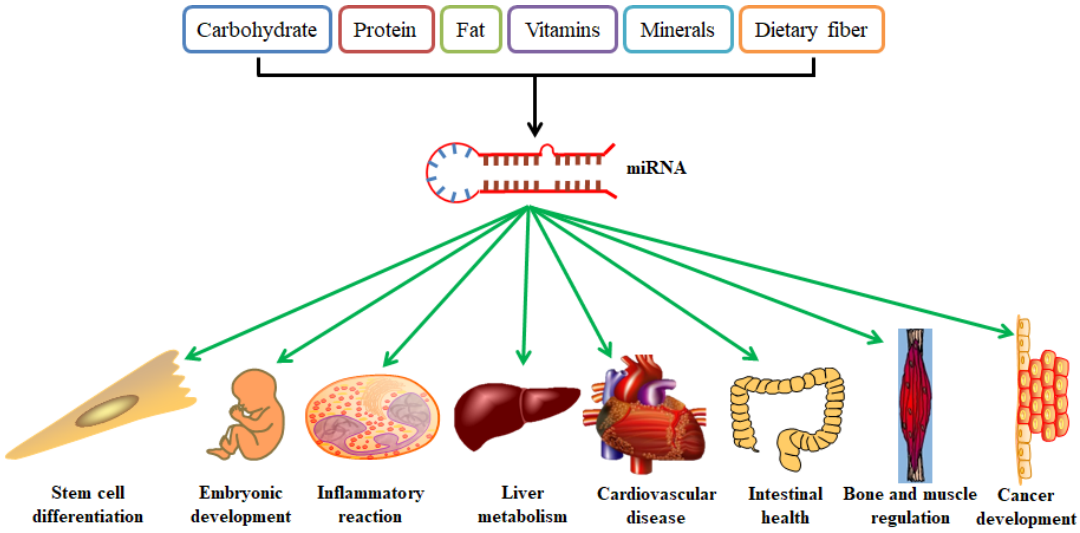
Keywords:
miRNA
Nutrients
Biological function
Disease prevention

ABSTRACT

Background: Food has three main properties: nutritional, sensory, and health-related functions. Nutrients, which provide components of the body and energy to maintain basic life activity, are very important. At present and in the future, the sensory function of food, especially its effects on health, will be given increasing attention. Moreover, miRNAs, small noncoding single-stranded RNA molecules first identified in 1993, play essential roles in post-transcriptional regulation.

Scope and approach: This review summarizes the regulation of the biological function of nutrients, including carbohydrates, protein, fat, vitamins, minerals, and dietary fiber. We further elucidated the effects of nutrients on modulating the physiological function of the body via altering miRNA profiles.

Key findings and conclusions: Increasing evidence has revealed that dietary nutritional regulation plays an important role in embryonic development, postnatal growth and development, and senescence. Deficiency or excess of certain nutrients is closely correlated with disease occurrence and development. Current studies have indicated that nutrient treatments exert variable biological effects by modulating miRNA expression. In summary, nutrient-regulated miRNAs might be novel mediators of nutrient-modulating biological functions and play irreplaceable roles in regulating physiological functions, suggesting a new approach for revealing the molecular mechanism of nutritional regulation.



资助信息：

该项目由北京市科技新星计划课题（Z181100006218043）、北京优秀人才培养资助青年拔尖团队项目(2016000026833TD01)、北京市自然科学基金面上项目（7172210）和国家自然科学基金面上项目（81471873）资助。

原文链接：

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食品与健康学院刘英丽副教授和王静教授团队在《Food Reviews International》（IF4.113）上发表“ Celiac Disease and Immunogenic Wheat Gluten Peptides and the Association of Gliadin Peptides with HLA DQ2 and HLA DQ8”综述论文

小麦是世界三大粮食作物之一，在世界各地广泛种植。作为重要的食物蛋白来源小麦经过加工后可做主食或者配料，具有广大的消费市场，全球年产量逐年稳步上升。然而小麦及其制品在深受人们喜爱的同时，所含麸质蛋白会引起部分人群严重的过敏反应，其中，乳糜泻（celiac disease，CD）又称为麦胶性肠病、非热带口炎性腹泻，是携带有遗传易感基因的个体因摄入含麸质蛋白的谷物(如小麦、大麦和裸麦)及其制品而诱发的自身免疫性肠病，属非 I g E 介导的过敏反应。本论文总结了各种免疫原性谷蛋白肽的鉴定，并介绍了摄入特定的醇溶蛋白肽导致 CD 发病的机理，探讨了由免疫原性谷蛋白肽引起 α / β -醇溶蛋白尤其与 HLA-DQ2 和 HLA-DQ8 结合位点有关。本研究对于深入了解和认识乳糜泻，全面预防和控制乳糜泻的发生及为低麸或无麸质食品的开发和研究提供一定的思路和理论基础。

FOOD REVIEWS INTERNATIONAL
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REVIEW

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Celiac Disease and Immunogenic Wheat Gluten Peptides and the Association of Gliadin Peptides with HLA DQ2 and HLA DQ8

Kalekristos Yohannes Woldemariam[a], Juanli Yuan[b], Zhen Wan[a], Qinglin Yu[a], Yating Cao[a], Huijia Mao[a], Yingli Liu[a], Jing Wang[a], Hongyan Li[a], and Baoguo Sun[a]

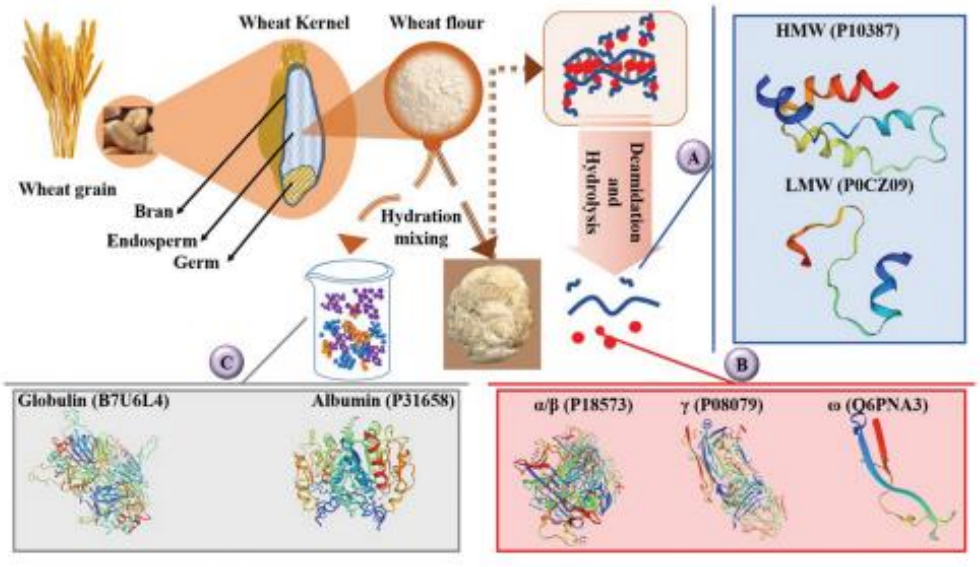
[a]School of Food and Health, China-Canada Joint Lab of Food Nutrition and Health (Beijing), Beijing Advanced Innovation Center for Food Nutrition and Human Health (BTBU), Beijing Engineering and Technology Research Center of Food Additives, Beijing Technology & Business University (BTBU), Beijing, China; [b]School of Pharmacy, Nanchang University, Nanchang, China

ABSTRACT

Wheat consists mainly of gluten with about 30% gliadin and 50% glutenin, which give gluten its unique viscoelastic properties and also mainly associated with the cause of celiac disease. Although the hydrolysis of gluten has been characterized, the discovery of new gluten-based peptides with high affinity toward T-cells is challenging. Currently, the highly immunogenic 33-mer gliadin peptide is considered to be the main cause of celiac disease. Thus, having consistent data for different gluten peptides with their respective immunogenicity is urgently needed. This report summarizes the various immunogenic gluten peptides identified, and the ingestion of specific gliadin peptide leading to the onset of CD, caused by the immunogenic α/β-gliadins especially in relation to the binding sites on HLA-DQ2 and HLA-DQ8.

KEYWORDS

Gluten; gliadin peptides; immunogenic peptides; celiac disease; wheat allergy; gluten hydrolysisIntroduction



团队成员博士留学生 Kalekristos Yohannes Woldemariam 为论文第一作者，刘英丽副教授和王静教授为共同通讯作者。

原文链接：

Kalekristos Yohannes Woldemariam, Juanli Yuan, Zhen Wan, Qinglin Yu, Yating Cao, Huijia Mao, Yingli Liu, Jing Wang, Hongyan Li & Baoguo Sun (2021): Celiac Disease and Immunogenic Wheat Gluten Peptides and the

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食品与健康学院刘英丽副教授和王静教授团队在《Food Research International》（IF4.972）上发表” Degradation of aflatoxin B1 by a recombinant laccase from Trametes sp. C30 expressed in Saccharomyces cerevisiae: a mechanism assessment study in vitro and in vivo”的研究论文

黄曲霉毒素 B1（AFB1）具强烈的毒性和致癌性，其污染广泛存在于粮食作物、食品和饲料中，近些年来其污染范围在不断扩大。如何高效无污染地脱除 AFB1 成为一种迫切的需要，意义重大。本研究采用酶法降解 AFB1，选用具有广泛底物的漆酶进行异源表达，评价了重组漆酶对 AFB1 降解的影响。结果表明，漆酶能有效降解 AFB1，降解率可达 91%。UPLC-MS 表明，AFB1 主要降解产物有 C16H22O4, C14H16N2O2, C7H12N6O 和 C24H30O6。提出了两种可能的降解途径：1）AFB1 连续丢失-CO，H2O，H+，NH2 反应后，呋喃环的双键断裂；2） AFB1 在失去-CO 后发生脱碳反应，H+的附加反应破坏了双键。AFB1 中的两个毒理学活性位点，包括糠醛环的双键和香豆素部分的内酯环均被破坏。通过 HepG2 细胞和体内试验评价 AFB1 降解产物的毒性，结果表明，与非漆酶降解的 AFB1 相比，肝细胞凋亡、肝和肾脏组织病理学损伤、氧化应激和炎症降低。此外，AFB1 降解产物明显降低了细胞毒性和肝毒性。本研究对于阐明漆酶催化机理、构效关系、酶促降解 AFB1 的规律和机制具有重要科学意义，对降解产物的结构解析及体内体外的毒性试验为真菌漆酶清除 AFB1 的应用安全性方面提供科学依据。

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Degradation of aflatoxin B_1 by a recombinant laccase from *Trametes* sp. C30 expressed in *Saccharomyces cerevisiae*: A mechanism assessment study *in vitro* and *in vivo*

Yingli Liu [a], Huijia Mao [a], Kalekristos Woldemariam Yohannes [a], Zhen Wan [a], Yating Cao [a], Thierry Tron [b], Junfang Lin [c], Yixuan Jiang [a], Hongyan Li [a], Jing Wang [a,*]

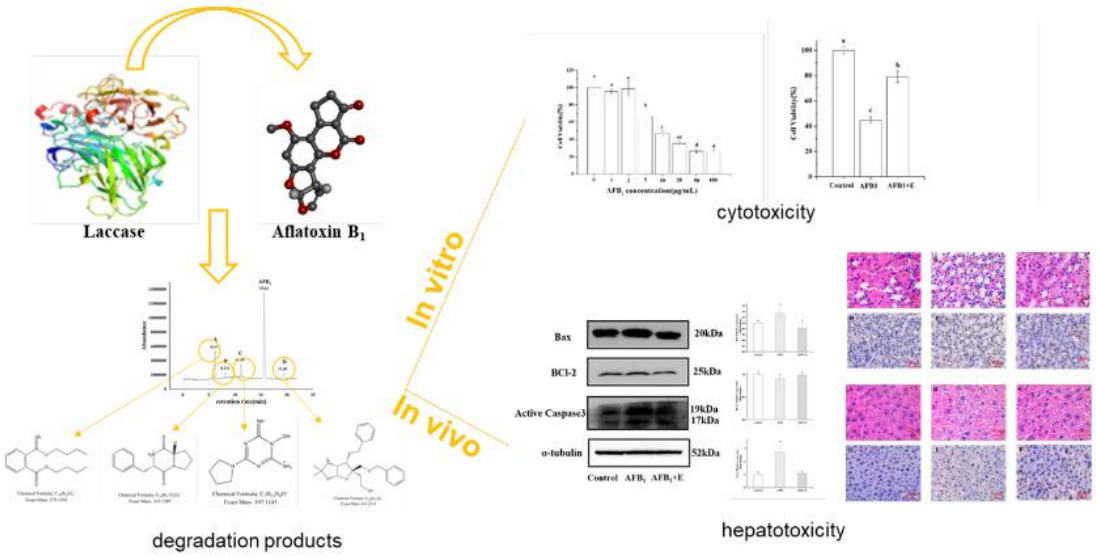
[a] Beijing Advanced Innovation Center for Food Nutrition and Human Health, China-Canada Joint Lab of Food Nutrition and Health (Beijing), Beijing Engineering and Technology Research Center of Food Additives, Beijing Technology and Business University (BTBU), 11 Fucheng Road, Beijing 100048, China
[b] Aix Marseille Université, Centrale Marseille, CNRS, iSm2 UMR 7313, 13397, Marseille, France
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ARTICLE INFO

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Laccase
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Degradation products
Cytotoxicity
Hepatotoxicity
Evaluation

ABSTRACT

Aflatoxin B_1 (AFB_1) is the most harmful mycotoxin and presents risks to human health. Utilization of enzyme to degrade AFB1 is a promising strategy to overcome this problem. In this study, we evaluated the effect of recombinant laccase expressed in *Saccharomyces cerevisiae* on the degradation of AFB_1. It was found that AFB_1 could be degraded effectively by laccase up to 91%.The results of ultra-performance liquid chromatography–tandem mass spectrometry (UPLC-MS) showed that there were four main degradation products of AFB_1 including $C_{16}H_{22}O_4$, $C_{14}H_{16}N_2O_2$, $C_7H_{12}N_6O$ and $C_{24}H_{30}O_6$. Two possible degradation pathways were proposed: 1) AFB_1 lost –CO continuously, and then double bonds of furan ring were broken after reactions with H_2O, H^+, and $–NH_2$; 2) AFB_1 occurred decarbonylation reaction after losing –CO and double bonds were broken by additional reaction with H^+. Two toxicological activity sites in AFB_1, including a double bond of furo-furan ring and lactone ring in the coumarin in moiety, were destroyed. The toxicity of AFB_1 degradation products was evaluated on HepG2 cells and *in vivo* tests, and the results indicated a decrease in hepatocytes apoptosis, liver and kidney histopathological lesions, oxidative stress, and inflammation as compared to non-laccase degraded AFB_1. Moreover, the AFB_1 degradation products significantly decreased the cytotoxicity and hepatotoxicity. This investigation provides innovative evidence on the effectiveness of laccase expressed in *Saccharomyces cerevisiae* in detoxifying AFB_1.



本研究获得国家自然科学基金（No. 31601564）支持。

原文链接：

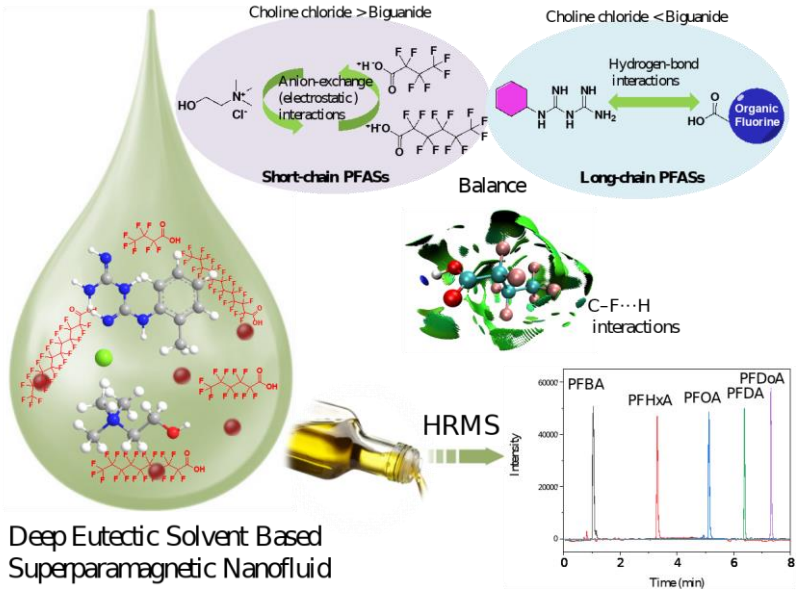
Yingli Liu , et al. "Degradation of aflatoxin B 1 by a recombinant laccase from Trametes sp. C30 expressed in Saccharomyces cerevisiae : a mechanism assessment study in vitro and in vivo." Food Research International (2021).

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轻工科学技术学院樊琛副教授和曹学丽教授团队在 Talanta 中发表文章

轻工科学技术学院生物工程系樊琛副教授和曹学丽教授团队发表题为《New deep eutectic solvent based superparamagnetic nanofluid for determination of perfluoroalkyl substances in edible oils》在《Talanta》上。

全氟化合物（PFAS）是重要的新兴污染物，其对人类健康的威胁已引起全球的广泛关注。该团队开展了基于新型 1-(邻甲苯基)双胍类深共熔溶剂（DES）超顺磁纳米磁流体直接选择性富集分离食用油中全氟羧酸（PFCA）的研究。该研究通过调整 DES 组分的比例来平衡静电、离子交换、氢键等相互作用，使得不同链长的目标物（C4-C12）的回收率均得到提升（>90%）。同时采用分子模拟技术佐证体系内存在 N－H・・・F 相互作用，其提高了 DES 对 PFCA 的选择性，显著地降低了基质的干扰效应。利用超高效液相色谱-电喷雾离子化-四级杆飞行时间串联质谱（UPLC-ESI-QTOF-MS）进行准确定量分析，所建立的检测方法具有较低的检出限（0.3-1.6 pg g-1）。该方法被应用于橄榄油、香油、葵花籽油、玉米油、山茶籽油、大豆油、调和油的分析，并检测出包括短链全氟丁酸（PFBA）在内的多种目标物，浓度为 5 pg g-1 至 2.5 ng g-1。所建立的分析检测方法具有快速简单、前处理材料用量少，回收率高、基质效应弱、样品用量小，检出限低等优点。



该研究工作受到北京市基金-市教委联合资助项目（KZ202010011017）和北京工商大学青年教师科研启动基金项目（QNJJ2020-12）资助。

论文信息：

Chen Fan, Huijun Wang, Yang Liu, Xueli Cao*, New deep eutectic solvent based superparamagnetic nanofluid for determination of perfluoroalkyl substancesin edible oils, Talanta, 2021, 122214.

DOI: 10.1016/j.talanta.2021.122214

轻工科学技术学院樊琛副教授和曹学丽教授团队在 Talanta 中发表文章

近日，我校化学与材料工程学院高海南副教授荣获国际先进材料协会(International Association of Advanced Materials，IAAM)颁发的“IAAM 2021 年度青年科学家奖（IAAM Young Scientist Medal)”，以表彰她在凝胶基功能高分子材料领域所做出的重要贡献。在先进材料 2021 年系列报告会上 (Advanced Materials Lecture Series 2021) 高海南作了题为“Euryhaline hydrogel with constant swelling and salinity-enhanced mechanical strength in a wide

salinity range”的邀请报告，获得与会专家和国际著名企业的关注和好评。相关工作的论文成果发表在Nature communications和Advanced functional materials等国际顶级期刊。研究成果推动了水/油凝胶界面材料在宽盐域环境下的应用，如宽盐域下抗污染界面、油水分离设备以及高离子强度导电离子凝胶等方面。此次获奖表明该项研究工作获得了国际同行的高度认可。

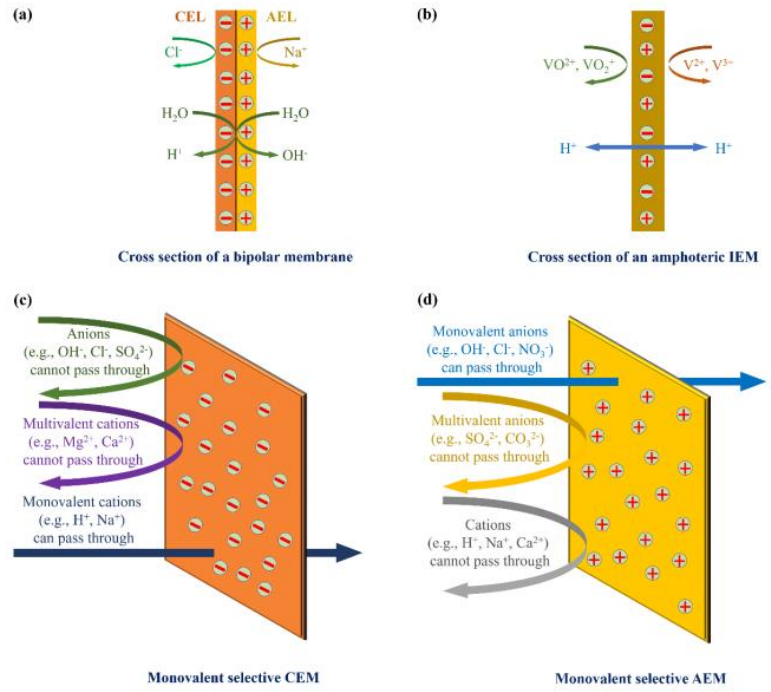
国际先进材料协会（International Association of Advanced Materials, IAAM, Org. no. 802503-6784, Sweden）是一个由全球先进材料领域研究人员组成的国际学术组织，致力于为先进材料科学、工程和技术在世界范围内的快速发展提供交流平台，现有来自世界各国大学和研究所的会员 5,0000 余人，协会定期组织各种学术会议和专题论坛。IAAM 科学家奖是由该协会在世界范围内根据研究人员近 10 年来在先进材料科学与工程技术领域所取得的工作成就进行评选并最终授予在该领域做出重要贡献的优秀科学家的一种奖项。



生态环境学院环境与食品安全团队在国际期刊《Chemosphere》（IF：5.778）发表论文

生态环境学院环境与食品安全团队在国际期刊《Chemosphere》（IF：5.778）发表题为《A comprehensive review on the synthesis and applications of ion

exchange membranes》的综述文章。文章讨论了离子交换膜的工作原理及合成制备方法，着重讨论了绿色合成方法的发展趋势。此外，文章重点讨论了离子交换膜在各个领域的应用，比如在保障食品安全以及食品链污染防治中的应用（如食品工业污水处理等）。文章亦为离子交换膜的创新应用提供了一些思路。



本论文第一作者为生态环境学院姜善学副教授，通讯作者为生态环境学院姚志良教授，该研究工作受到北京市教委项目（PXM2019_014213_000007）和北京工商大学优青杰青培育项目（BTBUYP2020）资助。相关研究成果发表于《Chemosphere》（IF：5.778）2021 年第 282 卷，文章编号 130817。

原文链接：

https://doi.org/10.1016/j.chemosphere.2021.130817

论文引用：

Jiang, S., Sun, H., Wang, H., Ladewig, B.P., Yao, Z., 2021. A comprehensive review on the synthesis and applications of ion exchange

membranes. Chemosphere 282, 130817. https://doi.org/10.1016/j.chemosphere.2021.130817

人工智能学院刘丹副教授发表高水平学术论文

刘丹副教授长期从事磁性材料机理分析方面的研究工作，2020 年获批国家自然科学基金一项，2021 年获批北京市自然科学基金一项。磁性材料中非平庸拓扑磁畴结构因其具有纳米尺度、粒子属性、结构稳定等特征，不仅受到拓扑对称性保护，还可以利用低密度的自旋极化电流进行调控，有望成为新一代信息存储单元。基于此，对于稀土铁基合金的结构和磁性展开系统研究，深入分析不同磁畴拓扑态的相互作用机制及其与磁性能的关系，拓展拓扑学在新型稀土磁性材料中的应用。相关研究论文《Formation mechanism and energy interaction of spontaneous skyrmion in nanodisks》和《Exploration of nontrivial topological domain structures in the equilibrium state of magnetic nanodisks》分别发表在国际知名刊物《Journal of Magnetism and Magnetic Materials》和《Journal of Materials Science》上。

Journal of Magnetism and Magnetic Materials 527 (2021) 167773

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Research articles

Formation mechanism and energy interaction of spontaneous skyrmion in nanodisks

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According to Fig. 3(m), the total energy varies significantly when A is close to 1.7×10^{-11} J/m. The sudden increase of E_{tot} is caused by the change in topological state at the critical point of phase transition. The demagnetization energy leads to large total energy even though the exchange energy is small. As illustrated in Fig. 3(l), the domain structure of the system with high exchange interaction is uniformly distributed. Since the exchange interaction is the same in all directions of space, the can be formed in the large range of K_1 and A. In contrast, the system with low anisotropy is conducive to the formation of vortex configuration. Vortex state is a typical situation for soft magnetic materials in symmetric structure taken exchange and magnetostatic interactions into account only [39,40]. The existence of magnetic vortex was found by experimentation investigations in amorphous $Ce_{14}Fe_{80}B_6$ ribbons which consonant with the simulation result [37]. Compared with other

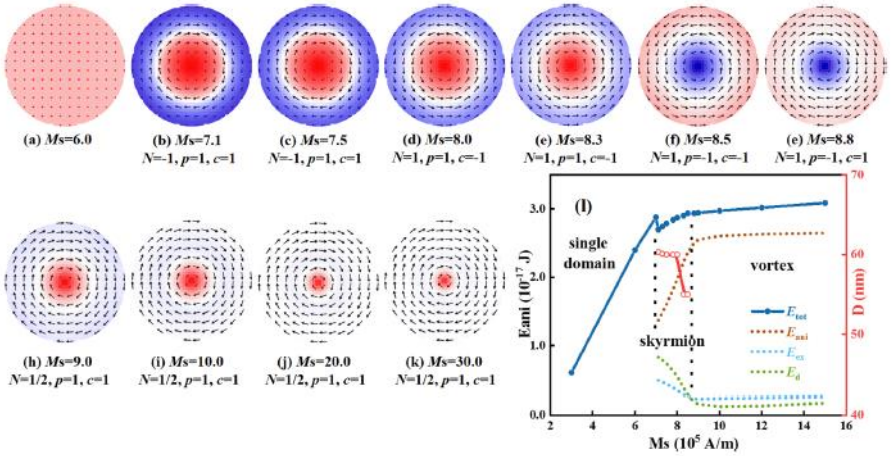


Fig. 4. (a)~(k) The schematic representations of equilibrium states under different saturation magnetization M_S ($\times 10^5$ A/m). (l) The different energies of the equilibrium states and the diameter D of skyrmion core as a function of material parameter M_S. The N, p, c at the bottom of each snapshot plot refers to the topological number, polarity, and chirality of the system, respectively. The arrows are the projection of in-plane magnetization where the red and blue represent the direction of + z and –z, respectively.

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J Mater Sci (2021) 56:4677–4685

Composites & nanocomposites

Exploration of nontrivial topological domain structures in the equilibrium state of magnetic nanodisks

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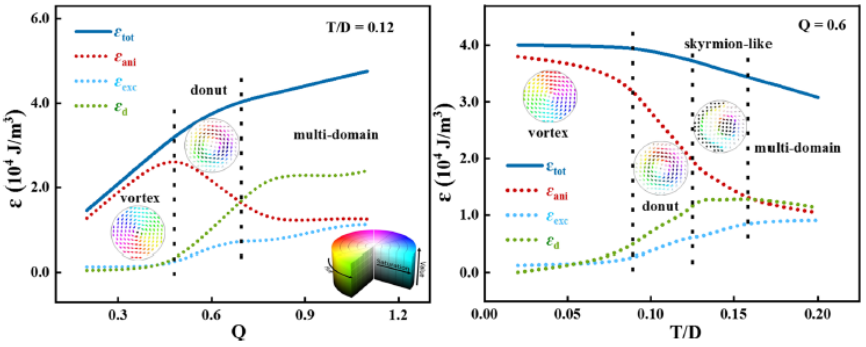
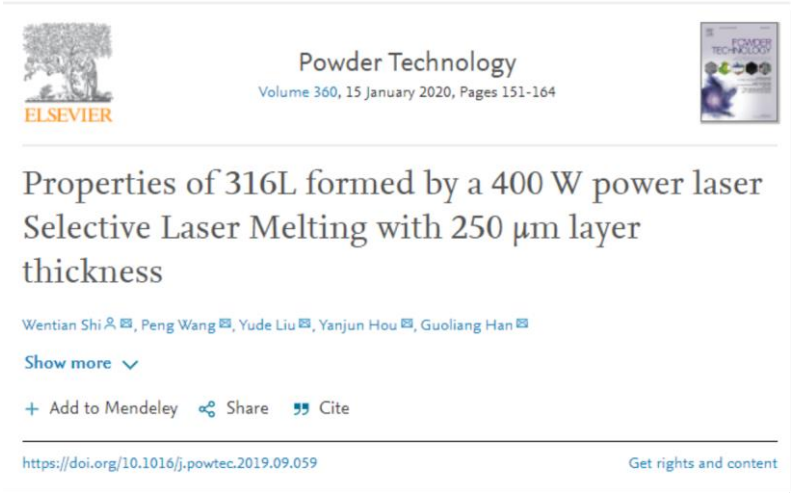


Figure 2 The total energy density ε_{tot}, the magnetocrystalline anisotropy energy density ε_{ani}, the exchange energy density ε_{exc} and the demagnetization energy density ε_d as a function of **a** quality factors Q and **b** aspect ratio T/D. The illustration depicts the corresponding equilibrium states. HSL color scale reflects the variation of a component of the magnetization in full orientation.

As shown in Fig. 1, the nontrivial topological magnetic domain structures mostly occur when the quality factor is less than 1 and the thickness is small. Therefore, more detailed studies are mainly conducted in the range of Q from 0.2 to 0.8 and T from 40 to 90 nm. The initial magnetic moment becomes along the $+x$ direction. The changes of quality factors and aspect ratio make great differences in magnetization process under different initial magnetization states. It can be seen from Fig. 3a that vortex state, donut state, skyrmion-like state and other multi-domain magnetic states exist in the equilibrium state. Compared to the equilibrium states obtained in Fig. 1, topologically nontrivial spin textures are more easily formed under this initial condition. When Q is around 0.7 and T/D is less than 0.1, the system presents a slightly irregular biskyrmion-like domain structure. The donut state shown in Fig. 3d is composed of the moments of M = −1 in the center and outermost, and the in-plane spiral moments between the two regions. Due to the topological properties, it can be classified as a special type

人工智能学院石文天教授发表关于激光选区激光熔化 316L 不锈钢性能的高水平学术论文

石文天教授在国际知名期刊《Powder Technology》（JCR 分区为 Q1 区；2019 年影响因子为 4.142）上发表了关于激光选区熔化的文章，研究了在 400 瓦激光功率和 250μm 粉层厚度的条件下，激光选区熔化 316L 不锈钢的性能。该研究推进了 316L 不锈钢 3D 打印成形工艺的研究，对该材料的快速、高质量成形也起到了一定的推动作用。



Powder Technology

Volume 360, 15 January 2020, Pages 151-164

Properties of 316L formed by a 400 W power laser Selective Laser Melting with 250 μm layer thickness

Wentian Shi, Peng Wang, Yude Liu, Yanjun Hou, Guoliang Han

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该试验研究表明，成形时所用的细粉可以有效减少激光选区熔化过程中的孔隙面积。在单熔道实验中选择曝光时间和点距离的最佳组合来缩小工艺参数窗口。在多层制造中，观察到成形件致密度最高可达到 99.99%，并且最大建造速率达到 9 mm^3/s；

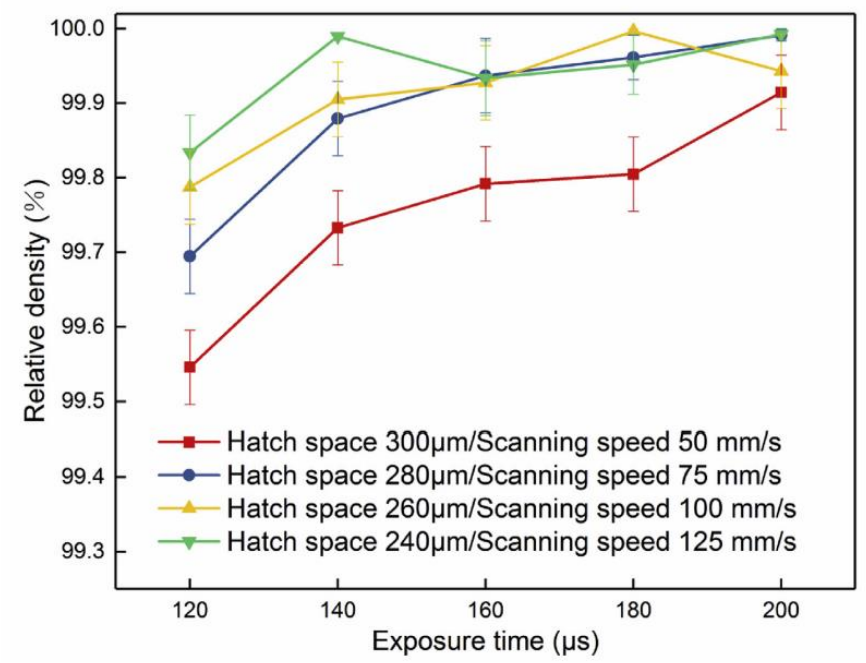


Fig. 5. Relative density curve of different exposure times.

同时通过辅助加工工艺，如表面重熔，可以大大提高表面质量，降低表面粗糙度。显微组织主要是等轴晶和柱状晶，比例大于 1。成形件的极限抗拉强度(UTS)、屈服强度(YS)和延伸率的平均值分别为 670 兆帕、474 兆帕和 26%。

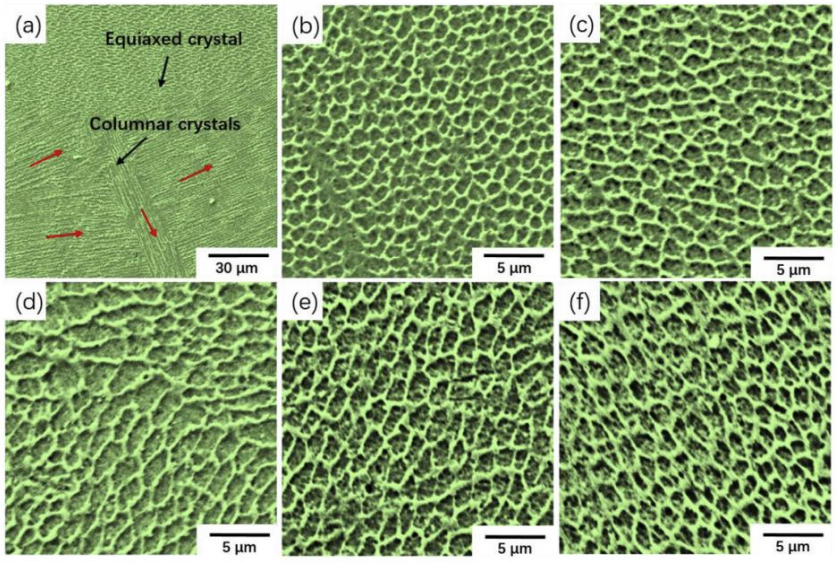


Fig. 12. Microstructure of 250 μm layer thickness (a) equiaxed crystals coexisting with columnar crystals; (b) exposure time of 120 μs; (c) exposure time of 140 μs; (d) exposure time of 160 μs; (e) exposure time of 180 μs; (f) exposure time of 200 μs.

该文章被多次引用，此研究不仅对成形工艺研究具有一定的指导作用，而且对增材制造的工业生产实践具有一定的参考意义。商学院刘贝妮老师发表高水平学术论文

刘贝妮 2021 年 2 月以第一作者身份在国际知名心理学类 SSCI 期刊《Frontiers in Psychology》在线发表学术论文《Influence of Leader Mindfulness on the Emotional Exhaustion of University Teachers: Resources Crossover Effect》，该刊位列 JCR-SSCI 二区。该文将资源保护理论与工作要求-资源模型相结合，探讨领导正念对高校教师情绪耗竭的影响，从领导和高校教师的双边视角，实证检验了领导正念资源的人际流动效应，以及高校教师正念和消极情感管理自我效能的初始资源效应。该文系刘贝妮主持的教育部人文社科项目《高校教师过度劳动的理论与实证研究》（19YJC790077）阶段性成果。



ORIGINAL RESEARCH
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Influence of Leader Mindfulness on the Emotional Exhaustion of University Teachers: Resources Crossover Effect

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This study combined conservation of resources theory with the job demands-resources model to explore the influence of leader mindfulness on the emotional exhaustion of university teachers Using a time-lagged research design, 388 paired data sets were gathered. Multiple regression and bootstrapping were used to test each hypothesis. The results showed that first, leader mindfulness significantly reduces the emotional exhaustion of university teachers. Second, the results showed that workplace telepressure partially mediates the relationship between leader mindfulness and the emotional exhaustion of university teachers. Third, university teacher mindfulness positively moderates the relationship between leader mindfulness and workplace telepressure. Finally, the results of this study indicate that self-efficacy in managing negative emotions negatively moderates the relationship between workplace telepressure and the emotional exhaustion of university teachers. This study empirically examined the interpersonal influence of leader mindfulness and the initial resources effect of university teacher mindfulness and self-efficacy in managing negative emotions from the bilateral perspective of leaders and university teachers.

Keywords: leader mindfulness, workplace telepressure, self-efficacy in managing negative emotions, university teacher mindfulness, emotional exhaustion