

ScienceDirect AI

助力科研学者快速掌握前沿科技信息

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爱思唯尔正式发布 ScienceDirect AI 精准洞察助力科研加速

研究表明，科研人员大约有**25%-35%**的时间花费在检索和阅读文献上。**SD AI**技术可以大大降低**50%**科研阅读文献时间

- **广泛而深入的可信内容库与生成式AI的结合：** ScienceDirect AI从全球领先的同行评审全文文章和书籍章节中提取洞察。
- **可追溯、基于科学记录的研究洞察，并且提供内容背景：** 信息的可追溯性和可重复性对研究完整性至关重要。为确保洞察的可靠性并可被复用， ScienceDirect AI提供了清晰的信息来源和链接，包括研究文章中的具体段落，让科研人员能够进一步探索。
- **负责的AI：** ScienceDirect AI 能够确保高准确度，降低幻觉和偏见风险。用户可以透明清晰地了解 AI 如何生成其答复。
- **与科研人员共同开发：** 来自全球70所大学和研发密集型公司的三万多名科研人员和图书馆员帮助测试和开发了ScienceDirect AI。反馈显示，该工具平均为他们节省了50%的文献检索时间，并有助于提升他们的研究效率与质量。

突破文献围城，解码核心洞见：

ScienceDirect AI 全新上线

3月25日 15:00-16:00

ScienceDirect AI 能够帮助用户从超过 1400万篇可信赖的同行评审期刊文章和图书章节中快速检索和总结核心洞见。在ScienceDirect 平台上精准获取和比较研究目标、实验方法、研究结果等信息，助力科研人员高效识别有价值的科研洞见。从来自70个机构的1000多名研究人员的测试版用户报告发现，使用 ScienceDirect AI每周可节省平均五个小时的科研时间。

您将直接听取产品团队的介绍，观看ScienceDirect AI实际演示以及在实际科研场景中的应用，并探讨AI时代下的科研范式迁移、方法论升级、人机协同等热门议题。

研讨会核心聚焦

- » **上新：** ScienceDirect AI演示和爱思唯尔负责的AI解决方案
- » **破局：** 科研范式迁移
- » **重构：** 方法论升级矩阵
- » **规则：** 人机协同未来素养
- » **应用：** 变革中的科研场景



扫描二维码
报名研讨会

ScienceDirect AI 助力科研人员快速掌握前沿科技信息

利用全文数据生成专业的AI总结，帮助您用自然语言描述问题，从超过1500万篇文章和书籍章节中获取见解

支持多语种自然语言提问
从SD 全文数据库中生成专业综述总结

可从SD查询到全文的参考文献

References from summary (10)

Effect of temperature history during additive manufacturing on crystalline morphology of PEEK

Austin Lee, Mathew Wynn, ... Navid Zobeiry

Advances in Industrial and Manufacturing Engineering • 2022

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The study highlights that variations in printing parameters significantly affect the crystallinity of semi-crystalline polymers, which in turn influences their mechanical performance. Understanding these variations is crucial for additive manufacturing practices.

How relevant is this answer? ☆☆☆

Retrieving back plastic wastes for conversion to value added petrochemicals: opportunities, challenges and outlooks

Manish Kumar, Shiv Bolan, ... Nanthi Bolan

Applied Energy • 2023

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Additives can enhance the chemical, physical, and mechanical properties of polymers, impacting their performance in additive manufacturing. They also help reduce degradation from environmental factors, which is important for testing polymer properties.

How relevant is this answer? ☆☆☆

快速定位原文中与问题相关的内容

Answer found in section: "Manufacturing of plastics"

Improvements to the basic chemical, physical and mechanical properties can be done through the incorporation of additives. These also have protective effects, reducing degradation of the polymer from high heat, or bacteria [2]. They have an impact on viscosity and melt flow in polymer manufacturing. Moreover, additives give products their colour and other unique qualities including increased surface properties, less friction, and flame retardancy [8].

Ask ScienceDirect AI Beta

Discover insights across publications ⓘ How it works

How can I test the effects of additive manufacturing on the structure, mechanical properties, and crystallinity of polymers?

Get answers

Summary answer

Testing the Effects of Additive Manufacturing on Polymers

To test the effects of additive manufacturing on the structure, mechanical properties, and crystallinity of polymers, consider the following steps:

**1. Printing Parameters:

- **Crystallinity Variability:** Adjusting printing parameters can significantly affect the crystallinity within the polymer part, which in turn influences mechanical performance and chemical stability (Lee et al., 2022), (Hart, Dunn & Wetzel, 2020).
- **Thermal Cycles:** The complex thermal cycles during additive manufacturing can alter microstructures, impacting mechanical properties such as tensile strength (Lia et al., 2018).

**2. Mechanical Properties:

- **Internal Defects:** Monitor for internal defects like voids, which can affect mechanical properties and lead to failure in lattice structures under stress (Wei et al., 2024).
- **Print Orientation:** Investigate the effects of print orientation on mechanical properties. For instance, layer orientation can affect tensile fracture behavior and anisotropic mechanical performance (Palma et al., 2019), (Dai et al., 2024).
- **Process Parameters:** Vary process parameters such as infill pattern and density to observe changes in tensile, compression, flexural, or impact strength (Vallejos Baier et al., 2021).

Compare Experiments 临床试验和其他实验比较

专注于每篇文章的核心部分，详细总结文献的实验方法、结果和结论，并对多篇相关文献进行比较

文献主题	实验/研究	实验目标	实验材料	实验方法	实验结果	讨论总结
ARTICLE	EXPERIMENT / STUDY	GOAL	MATERIALS	METHODS	RESULTS	CONCLUSION
Article Increased fracture toughness of additively manufactured semi-crystalline thermoplastics via thermal annealing ↗ Kevin R. Hart, Ryan M. Dunn, Eric D. Wetzel <i>Polymer</i> • Volume 211 • 2020 Export article as CSV	Fracture toughness testing	To evaluate the critical elastic-plastic strain energy release rate (J _{Ic}) of the interlaminar region of additively manufactured single edge notched bend (SENB) specimens made from polylactide (PLA) polymer, and to study the effect of post-print thermal annealing and cooling rate on the degree of crystallinity and fracture toughness.	Single edge notched bend (SENB) specimens measuring 100 × 20 × 10 mm, fabricated using fused-filament fabrication (FFF) with 1.75 mm polylactide (PLA) filament, printer nozzle diameter of 0.5 mm, nozzle temperature of 200 °C, bed temperature of 50 °C, 454 layers with [0/90] orientation, 2 perimeter shells, 100% infill density, layer height of 0.22 mm, 12.7 μm thick poly-imide (Kapton) tape as pre-crack notch.	SENB specimens were subjected to post-print thermal annealing at 160 °C for 2 hours, then cooled at various rates (quenched in ice water or cooled at 1 °C/min) to induce different degrees of crystallinity. Fracture testing was performed in three-point bending in displacement control at 0.5 mm/min, with crack propagation monitored using a CCD camera. Fracture surfaces were analyzed using optical and scanning electron microscopy.	As-printed PLA SENB specimens had an interlaminar fracture toughness of 2.73 ± 0.48 kJ/m ² . Annealed and quenched specimens (amorphous, 0% crystallinity) had a toughness of 5.62 ± 1.81 kJ/m ² . Annealed and slowly-cooled specimens (25% crystallinity) had a toughness of only 0.63 ± 0.017 kJ/m ² .	Annealing can increase the interlaminar toughness of additively manufactured PLA, but only if the material is quenched rapidly after annealing to maintain an amorphous state. Slow cooling after annealing results in high crystallinity and low fracture toughness.
	Differential scanning calorimetry (DSC)	To determine the maximum enthalpy of cold crystallization (ΔH _{cc} *) of PLA polymer, which establishes an upper limit on the degree of crystallinity that can be induced using common heating and cooling mechanisms.	PLA filament (1.75 mm diameter) pelletized by manually cutting into 10 mm segments, fed into a twin-screw micro-compounding machine at 200 °C and 50 rpm for 10 minutes to create an amorphous melt, then quenched in an ice water bath.	The quenched amorphous PLA extrudate was dried and then subjected to a heat-cool-heat DSC cycle between 40-200 °C at 5 °C/min to measure the maximum enthalpy of cold crystallization.	The maximum enthalpy of cold crystallization (ΔH _{cc} *) for the fully amorphous PLA polymer was 21.7 J/g.	The maximum enthalpy of cold crystallization establishes an upper limit on the degree of crystallinity that can be induced in the PLA polymer using common heating and cooling mechanisms.

Reading Assistant 阅读助手

节省阅读时间，针对单一文章回答用户提出的问题，提供详细解释和定制摘要，让您更高效地理解和利用文献的内容



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Questions you could ask:

- What potential does plastic waste conversion to value-added products hold for environmental sustainability?
- What factors influence the thermochemical conversion of plastic waste into valuable products?
- What are the environmental concerns associated with plastic waste mismanagement?

Actions you could take:

- Summarize this article
- Summarize experiments

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How can I test the effects of additive manufacturing on the structure, mechanical properties, and crystallinity of polymers?

The given query is not directly relevant to the content of the article, which focuses on the retrieval of plastic wastes for conversion to value-added petrochemicals. The article does not discuss the effects of additive manufacturing on polymer properties.

The article provides an overview of the following key points:

- Plastic production, sources, and processing methods [1](#) [2](#)
- Environmental challenges associated with plastic waste [3](#) [4](#)
- Technologies for converting plastic waste into petrochemicals, including pyrolysis, gasification, hydrothermal liquefaction, and catalytic conversion [5](#) [6](#)
- Economic and life cycle analysis of plastic waste conversion processes [7](#) [8](#)
- Opportunities and challenges in retrieving plastic waste [9](#) [10](#)

To test the effects of additive manufacturing on

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