

# 科研圈的新质生产力-Scopus AI 使用指南

## Scopus<sup>®</sup> AI

Trusted content. Powered by responsible AI.

### Step 1: Scopus AI 自然语言提问

将大语言模型（LLM）应用到 Scopus AI 中，让科研人员可以直接通过对话提问的形式对任意科学问题进行提问，比如直接在对话框中提问：

可以吸收电磁波的服装材料有哪些？请用表格总结



支持中文提问，Copilot 功能可以展示科学问题的形成过程，使 AI 检索过程更加透明。

- 自然语言转换：帮助学者问出好问题

- 关键词检索：辅助构建检索式

### 可以吸收电磁波的服装材料有哪些？请用表格总结

Hide Copilot steps ^

☑ Creating a plan to answer your query

☑ Performing natural language search:

- What are the clothing materials that can absorb electromagnetic waves?

☑ Performing keyword search:

- ("electromagnetic" OR "EM" OR "radiofrequency" OR "microwave") AND ("wave" OR "radiation" OR "signal") AND ("absorbing" OR "attenuating" OR "shielding" OR "dissipating") AND ("clothing" OR "fabric" OR "material" OR "textile") AND ("protection" OR "safety" OR "performance" OR "application")

☑ Generating summary

### Step 2 Scopus AI 可溯源的概要及参考文献

基于提问，Scopus AI 生成一段对此提问基于科研论文的概要，并提供了数篇主要引用的科研文献，概要中每句描述都给出了相应的引用文献：

#### Summary

Based on the provided abstracts, several materials have been identified for their ability to absorb electromagnetic waves and can be used in clothing. Below is a summary of these materials, their properties, and their effectiveness in absorbing electromagnetic waves.

#### Electromagnetic Wave Absorbing Clothing Materials

Material	Properties	Effectiveness	Notes
Stainless Steel Fabric	High reflectivity, improved SE with seam sewing	SE improved to 45-50 dB with specific seam types <a href="#">1</a>	Commonly used in anti-radiation maternity clothing
Carbon Fiber Fabric	High absorption, flexible	Effective in combination with other materials <a href="#">2</a>	Often used in layered structures
Nano Aluminum Fabric	High absorption, used as intermediate layer	Best SE when used as an intermediate layer <a href="#">2</a>	Significant improvement in SE when combined with multi-ion fabric
Multi Ion Fabric	High absorption, used directly at neckline	SE increased by more than 5 dB when used at neckline <a href="#">2</a>	Effective in combination with nano aluminum fabric

#### References

- Reference 1  
Research on Anti-electromagnetic Radiation Maternity Wear with Absorbing Wave  
He S., Liu Z., Wang X., Wang H.  
*Progress in Electromagnetics Research Symposium* [7](#) 2021
- Reference 2  
Influence of wave absorbing material on shielding effect of the neckline of electromagnetic shielding clothing  
Su Y., Wang X., Duan J., Liu Z.  
*Progress in Electromagnetics Research Symposium* [7](#) 2017
- Reference 3  
Research Progress of Ferromagnetic Material/Graphene Composite Wave Absorbing Coating Fabrics  
Wang Y., Guo S., Liu Y., Zhao X.  
*Caillao Daobao/Materials Reports* [7](#) 2021
- [Show all 8 references](#)

### Step 3 查看扩展概要及相关参考文献

Scopus AI 提供“扩展概要” (Expand Summary)，对选定的科学问题进行渐进式研究和扩展，并得到有逻辑的基本综述框架，可以精读问题相关的基础性文献

Based on the provided abstracts, there is relevant information to answer the user's query about electromagnetic-absorbing clothing materials. Here's a summary of the different types of clothing materials that can absorb electromagnetic waves, how they work at the molecular level, their potential applications in the textile industry, and the challenges in developing effective electromagnetic-absorbing clothing materials:

#### Types of Clothing Materials that Can Absorb Electromagnetic Waves:

- **Ferromagnetic Materials:** These materials exhibit high absorption strength and wide absorption band due to magnetic loss and partial dielectric loss. However, they have poor oxidation resistance and high density [1](#).
- **Graphene:** Graphene has a huge specific surface area and can absorb electromagnetic waves through interfacial polarization and multiple scattering. However, its excessive specific surface area and intermolecular forces limit its application [1](#).
- **Reduced Graphene Oxide:** Prepared by the Hummers method, reduced graphene oxide has structural defects and oxygen-containing functional group residues, affecting its solubility and dispersibility [1](#).
- **PPy/Fe<sub>3</sub>O<sub>4</sub>/rGO Composite Fabrics:** These fabrics exhibit excellent wave absorption, UV resistance, antistatic properties, and thermal management properties, making them suitable for various application scenarios [2](#).

#### Molecular Level Working of Electromagnetic-Absorbing Clothing Materials:

- The absorption of electromagnetic waves by these materials occurs through mechanisms such as magnetic loss, dielectric loss, interfacial polarization, and multiple scattering [1](#) [2](#).

#### Potential Applications in the Textile Industry:

- Electromagnetic-absorbing clothing materials can be used to make protective clothing for human beings to protect them from the harm of electromagnetic waves [1](#).
- These materials are suitable for individual electromagnetic protection, individual protection in extremely cold environments, and individual heating physiotherapy [2](#).
- The application of different wave-absorbing materials and usage modes at the neckline of electromagnetic shielding clothing has been shown to have a significant influence on the shielding effectiveness of clothing [3](#).

#### Challenges in Developing Effective Electromagnetic-Absorbing Clothing Materials:

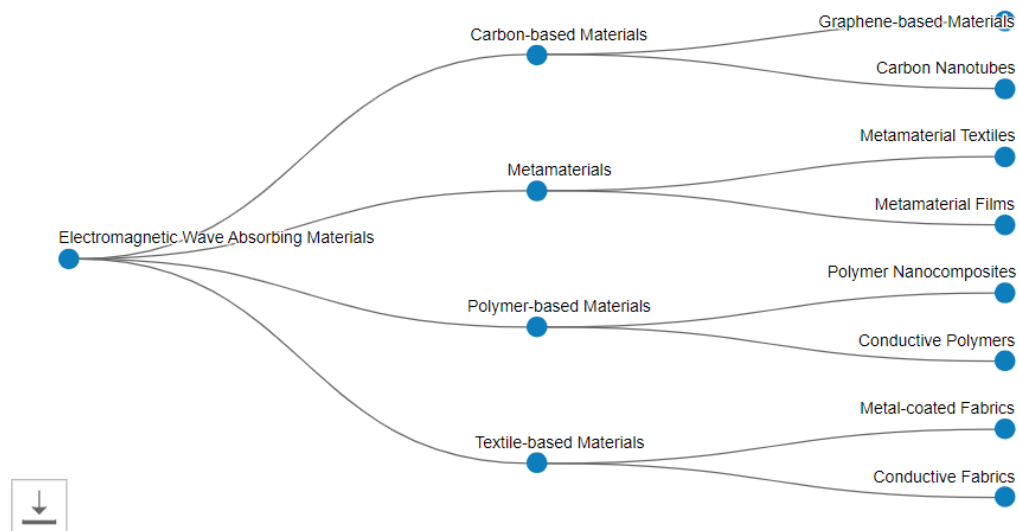
- One of the challenges is to prepare wave-absorbing fabric that meets the comprehensive requirements of comfort, softness, air permeability, and moisture permeability [4](#).
- The influence of double-layer absorbing materials on electromagnetic shielding fabrics has not been fully clarified, and there are few reports on this topic [5](#).

In summary, ferromagnetic materials, graphene, reduced graphene oxide, and composite fabrics such as PPy/Fe<sub>3</sub>O<sub>4</sub>/rGO exhibit potential for absorbing electromagnetic waves and have various applications in the textile industry. However, challenges remain in optimizing these materials for comfort and overall effectiveness, as well as in understanding the impact of double-layer absorbing materials on electromagnetic shielding fabrics.

## Step 4 思维导图形成知识脉络

Scopus AI 提供独有的“思维导图” (Concept Map)，帮助用户快速形成知识脉络。

Concept map



可针对思维导图中的任意节点深入探索：

### Linked concept path summary

Electromagnetic Wave Absorbing Materials → Polymer-based Materials

Based on the query about polymer-based electromagnetic wave absorbing materials, the abstracts provide relevant information to address this topic.

- **Polymer-based nanocomposites** have emerged as promising electromagnetic wave absorbing materials due to their light weight, easy processability, and high absorption performance [1](#).
- These materials exhibit desirable features such as **tunable absorption frequency** and multi-functionality, making them ideal for various applications [2](#).
- A study on **polymer-based composite materials** with a Poly-Ether-Ether-Ketone (PEEK) matrix and absorbers like reduced graphene oxide and Carbonyl Iron (CI) demonstrated high-performance broadband absorption in the 2.0–18.0 GHz frequency band [3](#).
- Additionally, a **polymer composite material** with a 0°/90° fiber orientation and Multiwall Carbon Nanotubes (MWCNTs) as filler materials showed strong electromagnetic properties, with an absorption of -38.69 dB at 10.5 GHz [4](#).
- The development of **polymer-based nanocomposites** for electromagnetic wave absorption involves the introduction of nanostructures and the simultaneous action of dielectric and magnetic materials with special structures, such as core-shell or multilayer structures [2](#).

## Step 5 新兴研究主题

通过优化的 AI 算法自动生成“持续性研究主题”、“上升性研究主题”以及“新兴研究主题”，研究人员就能有效地找出“空白区域”，并针对这些主题领域发表文章、进行合作和争取奖励资助机会。此外，Emerging Themes 所建议的研究假设，更是研究人员拟定或提升研究想法的绝佳起点。

## Metamaterial Absorbers for Electromagnetic Waves Consistent Theme

Metamaterials, engineered to have properties not found in naturally occurring materials, are gaining traction for their ability to absorb electromagnetic waves efficiently. These materials are being designed for applications ranging from stealth technology to 5G communication systems, offering ultra-broadband absorption and flexibility in design.

[Show references](#)

Potential Hypotheses:

- [Metamaterial absorbers can be tailored to specific frequency ranges for targeted electromagnetic interference mitigation](#)
- [Flexible metamaterial absorbers can be integrated into wearable technology for personal electromagnetic protection](#)

## Carbon-Based Electromagnetic Wave Absorbing Materials Rising Theme

Carbon-based materials, including carbon nanotubes, graphene, and carbon fibers, are showing significant growth in research interest due to their excellent electromagnetic wave absorption properties. These materials are lightweight, flexible, and can be derived from sustainable sources, making them ideal for a wide range of applications.

[Show references](#)

Potential Hypotheses:

- [Biomass-derived carbon materials can provide a sustainable and efficient solution for electromagnetic wave absorption](#)
- [Hybrid composites of carbon-based materials and magnetic nanoparticles can achieve superior](#)

## Step 6 进阶研究，AI 建议提问

Scopus AI 基于提出的科学问题给出建议提问，扩充研究的深度与广度，洞察科学问题及各种研究主题隐含的更多信息，凝练研究方向。

Go deeper

↳ What are the most common materials used in electromagnetic wave-absorbing clothing?

↳ How do different fabric compositions affect the absorption of electromagnetic waves?

↳ What are the key considerations when designing clothing materials to absorb electromagnetic waves?

使用小贴士：Scopus AI 可以通过轻松点击复制，得到问题、答案和参考文献的文本内容，直接用于撰写说明材料和添加参考文献。