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Mapping published studies on Polymer-Based Organic Semiconductor Materials: a bibliometric and thematic analysis

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Abstract
This project aims to perform a bibliometric analysis of knowledge management using articles in the Web of Science database from 2000 to 2025. The study examined the previous 25 years of publication in addition to conducting performance analysis and science mapping analysis of papers.
Co-occurrence of keywords, thematic mapping, co-citations, productive authors, collaborative authors and nations, citable documents, the most pertinent institutions, cited countries, and the scientific output of papers were all analyzed in the study. The study's performance analysis and science mapping analysis were conducted using Biblioshiny in R-Studio.
The current study included 3931 research articles on polymer-based organic semiconductor materials. The literature on polymer-based organic semiconductor materials has 13063 authors. Since early 2000, the number of studies on polymer-based organic semiconductor materials has increased rapidly. Early in 2000, the first works on statistical models and artificial intelligence were released. 35.97% of co-authors were from other countries. The China, United States, and Korea comprised the majority of the international corresponding authors. In terms of the overall quantity of papers and international partnerships, the China, United States, and South Korea were the most productive nations. The leading publications on polymer-based organic semiconductor materials include the ACS Applied Materials \& Interfaces, Journal of Materials Chemistry C, and Advanced Functional Materials. Polymer-based organic semiconductor materials researches will continue to grow in popularity day by day. To sum up, this study gave researchers a helpful bibliometric analysis and mapping for further research by presenting the trends and features of Polymer-based organic semiconductor materials studies.
Keywords: *Bibliometric analysis; Thematic mapping; Collaboration network; trend; polymer*

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I. Introduction

Polymer semiconductor materials not only have electronic properties of metals or semiconductors, but also have excellent processing properties and mechanical properties. By adding a side chain, organic semiconductor materials have strong solubility and can be easily processed into slurried or solubilized electronic inks. With its many benefits including ease of preparation, low cost, light weight, flexibility, transparency, mobility, and a wide range of potential applications polymer semiconductor materials have emerged as a research hotspot in recent years [1-7]. For a variety of low-cost, large-area applications, organic and polymer-transistor-based circuits are being researched, especially those that work with flexible plastic circuits [8].

For many years, polymer semiconductors with a carbon-based π conjugated backbone have been researched as active layers for a variety of organic electronic devices. They mix the mechanical properties of plastics, which will be one of the upcoming modulable electronic materials, with the electrical conductivity of metals and semiconductors. Conjugated materials' performance is determined by their multilayer microstructures in solid states as well as their chemical structures. Even with the tremendous efforts, a clear image of intrinsic molecular structures, microstructures, and device performances is still a long way off [9].

The preconceived notion that polymers cannot conduct electricity has been dispelled since the discovery of metallic conductivities in iodine-doped polyacetylene [10, 11], when all polymers were regarded as "insulating plastic." Because of their (semi)-conductive, electro-chemical, and optical characteristics, conjugated polymers are a novel class of polymers that have been developed for a wide range of electronic applications [12].

Organic semiconductors have become a feasible and potential commercial substitute for conventional inorganic materials like silicon in recent years. The scientific community is very interested in organic-based light emitting diodes, photovoltaic devices, photodetectors, and transistors [13]. Devices that use a logic circuit or radio frequency identifier, such memory, solar cells, and the like, as well as displays like liquid crystal or organic

electroluminescent displays, have all made use of semiconductor elements. Of these, an organic semiconductor element with an organic semiconductor film is better than an inorganic semiconductor element with an inorganic semiconductor film because of the lowered weight and cost as well as the outstanding flexibility [14].

Designed low-lying frontier molecular orbital energy levels are a frequent characteristic of n-type polymer semiconductors with strong electron mobility and good stability in air [15]. In a study of Choi et al. (2015) [15], materials were listed in roughly chronological order of the appearance of the key building blocks, such as various arylene diimides, or structural characteristics, including nitrile and fluorinated groups, in order to the progress in the area of n-type polymers.

In a study of Lee and Chang (2019) [16], it was demonstrated that conductive polymers are useful to improve the performance of composite photocatalysts for photocatalytic degradation of hazardous chemicals, antibacterial, and photocatalytic hydrogen production applications, focusing on the roles of conductive polymers. By improving the separation of photogenerated charge carriers and expanding the range of light absorption, conductive polymers can greatly increase the visible-light driven photocatalytic activity. Additionally, conductive polymers and semiconductor nanomaterials work in concert when conductive polymers are loaded with semiconductor photocatalysts, resulting in high photocatalytic degradation efficiency. Since polymer molecules have a tendency to act as a barrier to the aggregation process of photocatalysts, a high concentration of conductive polymers can aid in reducing the creation of large aggregates [16].

The purpose of this study is to undertake a comprehensive bibliometric review of the works in order to better understand the academic landscape, growth trends, influence, mappings, couplings, networking, and theme progression in the field of polymer-based organic semiconductor materials research.

II. Materials and Methods

Materials

The bibliometric analysis conducted in this study is based on data sourced from the Web of Science (WoS) database, a comprehensive and publisher-independent platform that provides extensive citation information across a wide range of academic disciplines [17, 18]. The dataset utilized for this study comprises a total of 3931 scholarly publications categorized under the research domains of "polymer organic semiconductor materials," all of which were retrieved from the Web of Science (WoS) database for the period spanning from 2000 to 2025 (Table 1).

To ensure a robust and systematic approach to data collection, relevant keywords, including but Relevant keywords, such as "polymer organic semiconductor materials," and other related terms relevant to multidisciplinary fields were carefully found and included in the retrieval process to guarantee a strong and methodical approach to data collection. After being methodically collected from the Web of Science (WoS) database, the complete records and cited citations were rigorously verified to determine their applicability to the study's thematic focus. The dataset was also carefully screened to remove any inconsistencies, guaranteeing that only relevant papers from the specified subject areas were included.

Table 1. Primary data document structure

Description	**Results**
MAIN INFORMATION ABOUT DATA	
Timespan	2000:2025
Sources (Journals, Books, etc.)	26
Documents	3931
Annual Growth Rate %	13.81
Document Average Age	8.09
Average citations per doc	44.45
References	86783
DOCUMENT CONTENTS	
Keywords Plus (ID)	4756
Author's Keywords (DE)	5808
AUTHORS	
Authors	13063
Authors of single-authored docs	20

AUTHORS COLLABORATION	
Single-authored docs	21
Co-Authors per Doc	7.94
International co-authorships %	35.97
DOCUMENT TYPES	
Article	3805
Article; book chapter	1
Article; early access	79
Article; proceedings paper	46

Methods

An R statistical tool called Bibliometrix is used to analyze and display bibliographic data from databases such as WoS and Scopus. The CRAN network project distributes and archives R (https://cran.r-project.org/). R, an open source program with extensive statistical features, is a great option for scientific computing, according to Aria and Cuccurullo. All of the primary bibliometric analytic techniques are included in this open-source application for quantitative research in scientometrics and bibliometrics. R runs on Windows and Linux operating systems and has a graphical user interface (Rstudio). Biblimetrix is now more user-friendly thanks to Biblioshiny, the shiny software that was released in version 2.0 [19].

"Polymer-based organic semiconductor materials in multidisciplinary" was obtained by analyzing the general profile and research performance of the recovered documents (year of publication, document type, topic area, original journal, nation and institution, and their collaboration, etc.).

The impact factor (IF) is a crucial indicator for evaluating the impact of a journal [20]. In this case, the 2019 Journal Citation Report's IF was used to assess the journals' impact. BibExcel was used to do frequency analysis and organize the databases according to related knowledge units. The knowledge unit cooccurrence link matrix was developed to analyze academic cooperation among the most prolific countries, areas, or universities. Additionally, the H-index calculated by BibExcel was used to assess and quantify the authors' effect [21, 22].

[23] Cobo et al. (2011) state that trend topics display a collection of themes grouped in a two-dimensional space based on their centrality on the x-axis and density on the y-axis. Co-citation analysis is often used to identify research topics and trends since the citations that scholars include in their papers can offer important insight into the intellectual foundations of a discipline.

The data was formatted using R software's "convert2pdf" tool [24]. For statistical analysis related to the topics addressed, R software's "bibliometrics" package and "bibloshiny" program were both utilized [25].

III. Results and Discussion

The scientific production of articles was calculated from 2000 onwards, as shown in Figure 1. The average number of citations per document was 44.45. The results indicated 13063 authors with 5808 author keywords. Co-authors per document was 7.94.

Figure 1. Main information from database. Generated using Bibliometrix

The source data showed that articles were the most common document type out of 3931 documents. Articles make up 98.83% of all documents. After articles, proceedings papers were the most common document type, accounting for 1.17% of all materials. Additionally, the other document types procedures papers, articles, and early access articles make up a very small percentage of total documents. According to a thorough bibliometric

analysis of the complete dataset, there were between 5 and 305 papers published annually between 2000 and 2025. After 2010, the yearly total of articles surpassed 100, suggesting a notable surge in article production. The year with the highest number of articles published was 2018. A total of 3588 articles were produced between 2010 and 2025. The total number of papers published between 2000 and 2025 is displayed in Figure 2.

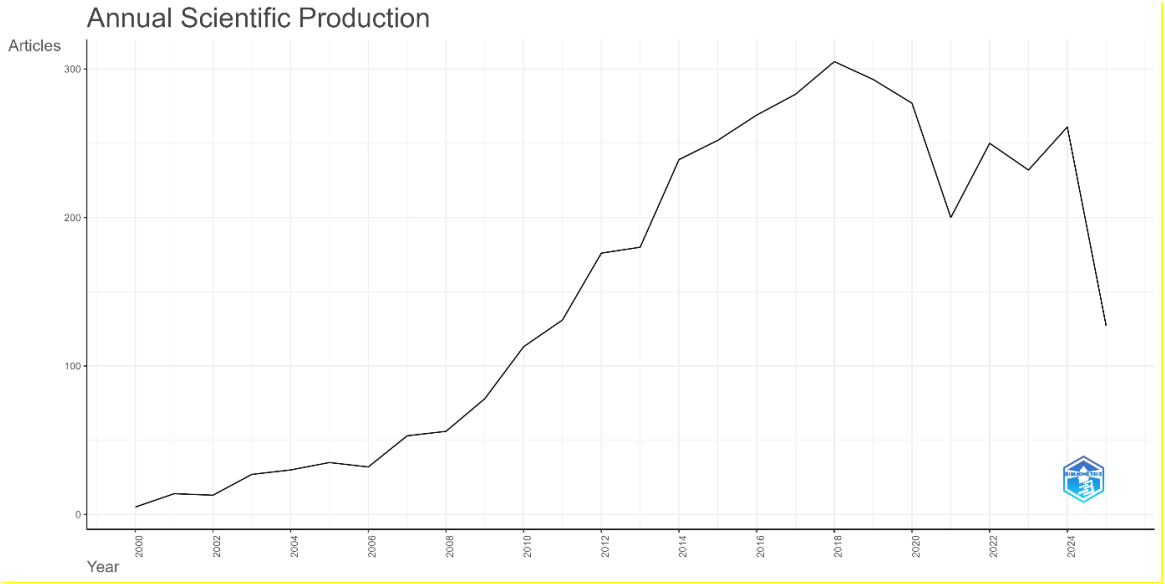

Figure 2. Number of articles published between 2000 and 2025

Figure 3 shows how the Three-Fields Plot is visualized. Depending on the particular goals of the researchers, this analytical tool allows the analysis of correlations between three different bibliometric variables. Authors, keywords, Keywords Plus, titles, abstracts, sources, references, and cited sources are a few examples of these categories. These fields were carefully chosen to enable a thorough comprehension of the dataset's thematic connections, authorial contributions, and scholarly trends.

The "author" category was positioned as the core field in this study using a methodical Three-Fields Plot, which served as the main hub of the analysis. The academic publications and publication outlets that have shared the pertinent research were represented by the "sources" category, which was placed in the left field. In the meantime, the "keywords" category, which was positioned in the appropriate field, offered information about the main conceptual frameworks and subject areas covered in the gathered corpus of literature. This arrangement provides useful bibliometric insights into the field's intellectual structure by enabling a thorough examination of the relationships among prolific writers, well-known publication sites, and the most common study issues.

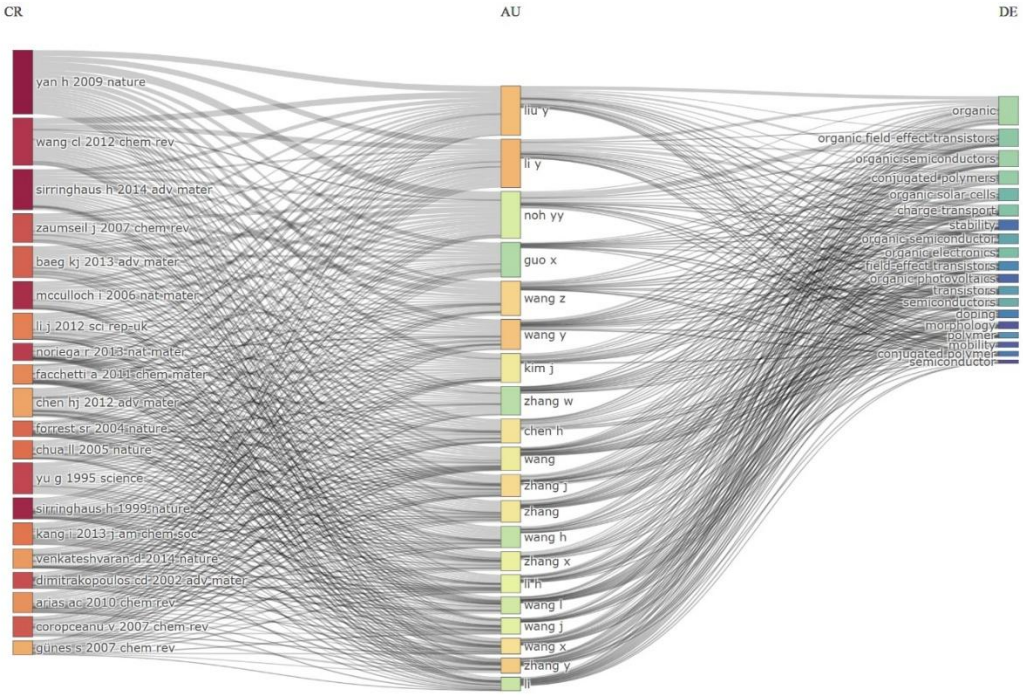

Figure 3. Collaborative studies

The distribution of the most frequently published academic journals is illustrated in Figure 4. According to the bibliometric analysis, ACS Applied Materials & Interfaces emerges as the leading journal in terms of publication volume, contributing a total of 613 articles to the scholarly discourse. This is followed by the Journal of Materials Chemistry C and the Advanced Functional Materials, which have published 536 and 470 articles, respectively. These findings highlight the central role of these journals in disseminating research on polymer-based organic semiconductor materials, and related scientific multidisciplinary applications.

Figure 5 presents an overview of the most frequently cited local sources within the analyzed dataset. The Advanced Materials was identified as the most highly cited journal, with a total of 22 713 citations, indicating its substantial impact and scholarly influence. This is followed by the Journal of the American Chemical Society, which has accumulated 15 092 citations, and the Advanced Functional Materials, which has garnered 8 975 citations. These citation metrics underscore the prominence of these journals in shaping the academic discourse within their respective fields.

Furthermore, the analysis revealed that the most influential and widely referenced journals in the domains of polymer-based organic semiconductor materials within multidisciplinary contexts include the Applied Physics Letters and Chemistry of Materials.

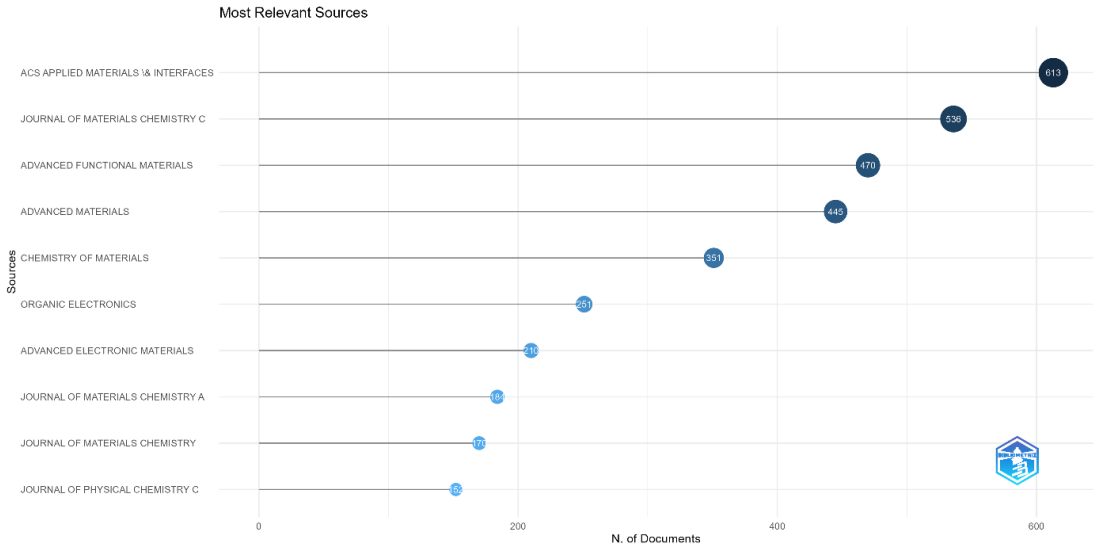

Figure 4. The most published articles in journals

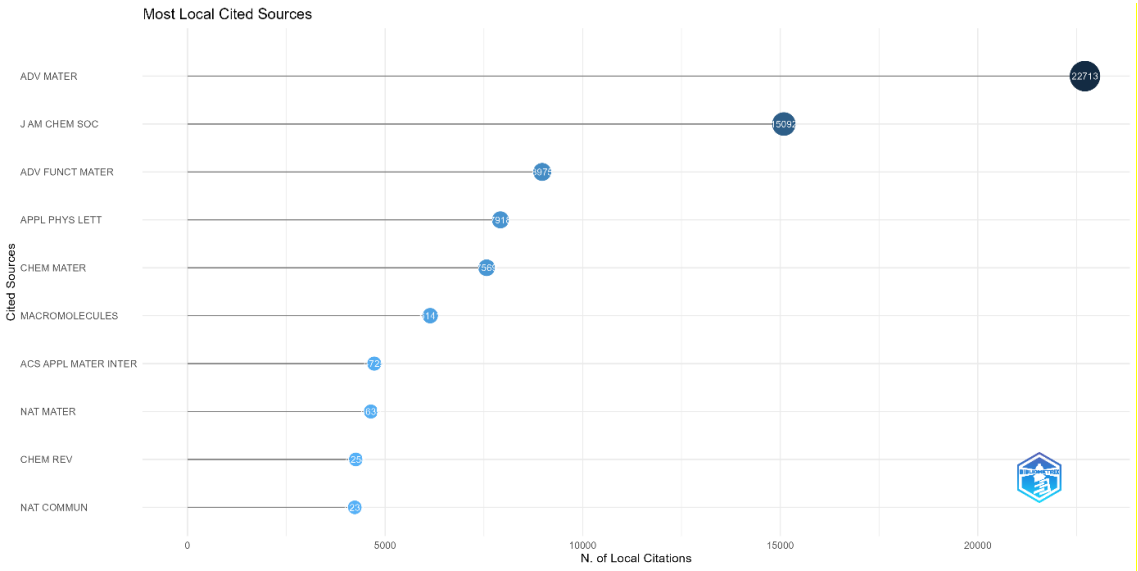

Figure 5. The most cited journals

Based on the bibliometric analysis, Advanced Materials ranked highest among academic journals, with an h-index of 125 and a total of 445 publications. This journal demonstrated a significant scholarly impact, outperforming other journals in both productivity and citation influence. Following closely, the Advanced Functional Materials attained an h-index of 93, while Chemistry of Materials secured the third position with an h-index of 84. Furthermore, Advanced Materials exhibited the highest citation count among all analyzed journals, accumulating a total citation count (TC) of 49201, thereby surpassing all other periodicals in terms of scholarly influence. In addition to its dominance in citation metrics, this journal, along with the Advanced Functional Materials and Chemistry of Materials, also secured the top three positions in the g-index ranking. The respective g-index values for these journals were 203, 138, and 128, as detailed in Table 2. These results reveal that the publications have created significant academic and scientific impact in their fields.

Table 2. Most productive journals

Source	**H index**	**G index**	**M index**	**TC**	**NP**	**PY start**
Advanced Materials	125	203	4.808	49201	445	2000
Advanced Functional Materials	93	138	3.72	27587	470	2001
Chemistry Of Materials	84	128	3.36	22865	351	2001
Acs Applied Materials \& Interfaces	58	76	3.412	16071	613	2009
Journal Of Materials Chemistry	54	95	2.077	10672	170	2000
Journal Of Materials Chemistry A	51	79	3.923	8031	184	2013
Journal Of Materials Chemistry C	51	82	3.923	13563	536	2013
Macromolecules	41	67	1.783	5105	113	2003
Organic Electronics	40	56	1.739	5755	251	2003
Advanced Electronic Materials	37	54	3.364	4706	210	2015

TC: Total citation, NP: Number of publication, PY: Per year.

The annual publication trends are illustrated on the left side of Figure 6, providing an overview of the progression in research output over the years. Since 2014, there has been a notable increase in the number of scholarly articles published across various academic journals addressing topics related to polymer-based organic semiconductor materials in multidisciplinary research.

The number of publications published in this field by ACS Applied Materials & Interfaces increased significantly from 6 in 2010 to 42 in 2024. The number of papers in the Journal of Materials Chemistry C increased from 38 in 2013 to 59 in 2014. From 4 publications in 2002 to 50 articles in 2024, Advanced Functional Materials demonstrated a notable increase in research productivity.

Likewise, other journals have also seen increases in their publication trends. While Advanced Materials published 2 articles in 2000, it published 39 articles in 2024. Chemistry of Materials published 2 articles in 2001 and continued to increase in the following years, publishing 43 articles in 2020 with the highest increase.

These trends indicate a growing academic interest in polymer-based organic semiconductor materials, particularly in multidisciplinary research, while also highlighting variations in publication dynamics across different journals.

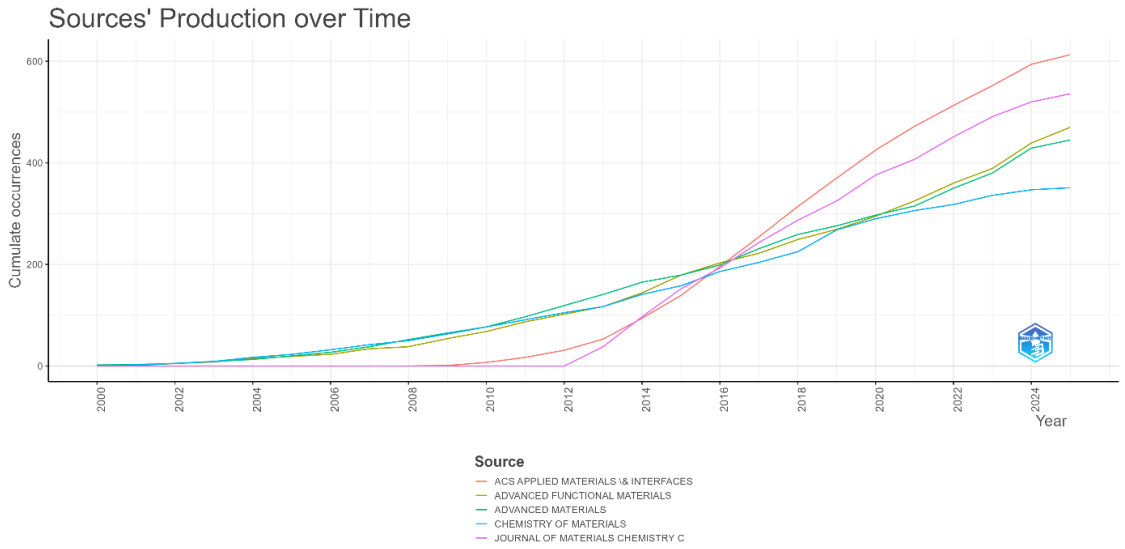

Figure 6. Sources production over time

The distribution of scholarly publications among various authors is depicted in Figure 7. Based on the bibliometric analysis, Li Y emerged as the most prolific author in this research domain, with a total of 168 published articles (f =168). Following closely, Liu Y ranked as the second most productive contributor, with 124 publications (f =124) in this field. Meanwhile, Wang Y secured the third position, having authored 115 publications (f =115) within this discipline. These results highlight the important contributions these academics have made to the field's knowledge base and demonstrate how they have shaped the field's scholarly discourse and research direction.

The yearly distribution of publications and associated citation counts for the most active writers in this field of study are shown in Figure 8. Larger and darker circles denote years of increased scholarly engagement in this graphic representation of the temporal evolution of research output among top researchers. For example, Li Y. published 1045 articles and received an average of 116.111 citations annually in 2017, demonstrating a notable increase in both research production and academic impact. This pattern highlights the author's significant impact on the field at that time.

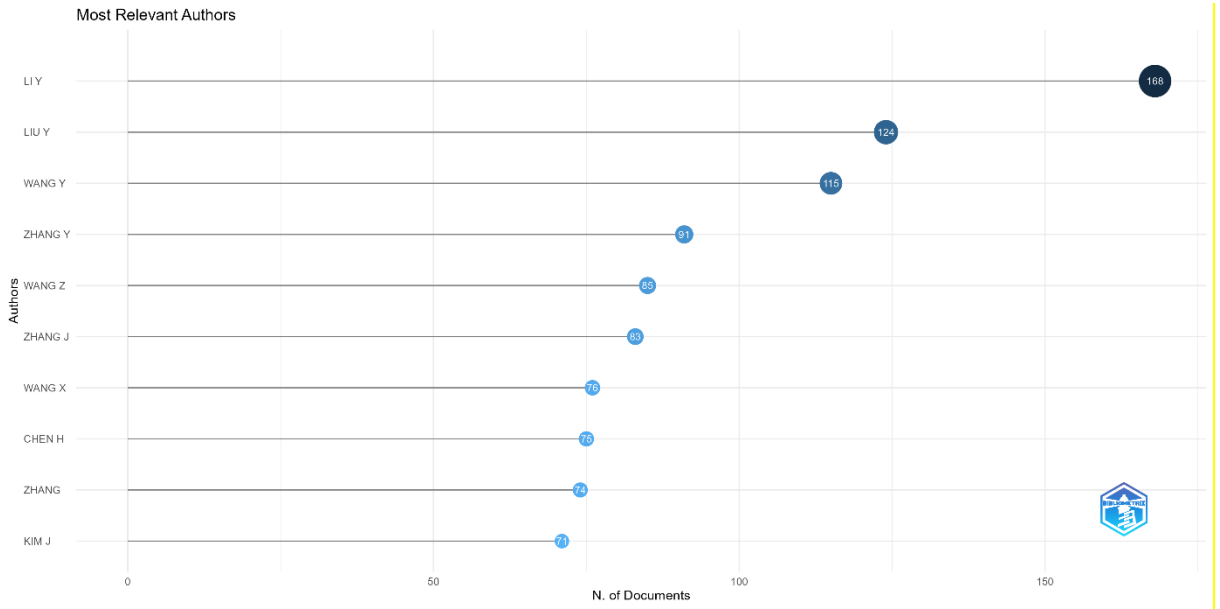

Figure 7. The most relevant authors

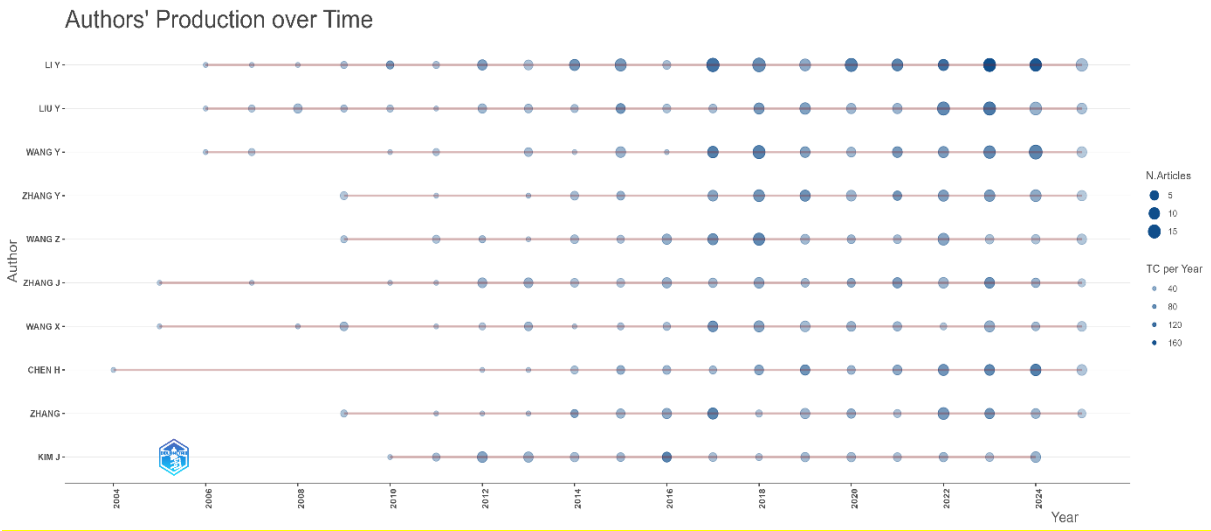

Figure 8. Top-Authors' production over the time

Additionally, an in-depth analysis of author keywords and thematic structures was conducted to identify prevailing research trends. Across the selected corpus of documents, a total of 4756 distinct keywords appeared 5808 times, reflecting the diverse and interdisciplinary nature of the research landscape. Among the most frequently occurring keywords each appearing at least 100 times were field-effect transistors (857), semiconductors (788), performance (772), thin-film transistors (597), polymer (594), charge-transport (538), conjugated polymers (507), mobility (489), system (322), transport (428), and polymers (409). Table 3 offers a thorough overview of these keyword distributions.

Table 3. Most frequently occurred keywords

Words	**Occurrences**
Field-effect transistors	857
Semiconductors	788
Performance	772
Thin-film transistors	597
Polymer	594
Charge-transport	538
Conjugated polymers	507
Mobility	489
Transport	428
Polymers	409

The Word Cloud approach was used to determine the most commonly used keywords, as seen in Figure 9. One well-known data mining method is word clouds, which graphically depict how frequently a word occurs in a given text or dataset. The word that appears the most frequently in this depiction is clearly displayed at the center, whereas words that are smaller and farther from the center indicate that they are used less frequently.

The analysis revealed that the most frequently used keywords in the dataset were field-effect transistors (f=857), semiconductors (f=788), and performance (f=772), highlighting their centrality in the research domain. Additionally, Figure 10 shows another word frequency representation using the Word TreeMap technique. Like Word Clouds, the Word TreeMap approach provides further insights into the research's subject focus by displaying the distribution of the most frequently used terms in the examined corpus of literature.

Figure 9. Word cloud of analyzed articles

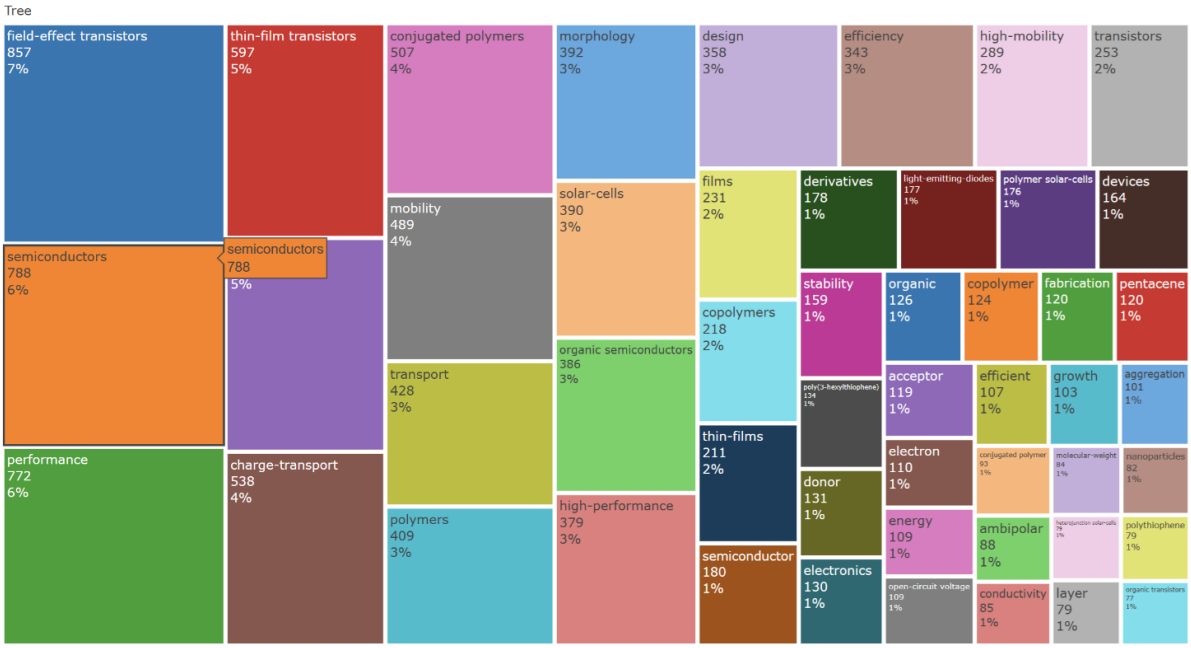

Figure 10. Word tree map of analyzed articles

In order to get insight into how thematic research trends have impacted the field, a trend topic analysis was carried out to look at how important terms have changed over time. This analytical method evaluates the logarithmic frequency of phrases that appear in published literature, so enabling the discovery of changes in scholarly focus. Keyword distributions over time were assessed using the bibliometric tool Biblioshiny (RStudio) in order to systematically examine topic trends within the sector from 2000 to 2025. Figure 11, which shows the chronological history of research themes based on keyword usage in academic papers, provides an illustration of the analysis's findings.

According to the findings, the keyword field-effect transistors was the most frequently utilized term, appearing 857 times in scientific studies conducted between 2013 and 2019. Notably, 2016 marked the peak year for this keyword in terms of research prominence. Similarly, the term management ranked as the second most

frequently used keyword, occurring 788 times in studies published between 2014 and 2020, with 2017 identified as its most trending year. Additionally, performance was recorded 772 times in research conducted between 2014 and 2020, making it the third most frequently occurring keyword, with its highest trend observed in 2017. The keyword thin-film transistors was used 597 times in studies spanning 2012 to 2018, ranking fourth in frequency, with its peak trend year identified as 2015. Meanwhile, polymer appeared 594 times in publications between 2014 and 2020, ranking as the fifth most frequently utilized term, with 2017 being its most trending year. Polymers appeared 409 times in publications between 2012 and 2020, ranking as the seventh most frequently utilized term, with 2016 being its most trending year.

All things considered, the keyword trends show a strong correlation with polymer-based organic semiconductor materials techniques, highlighting crucial topics like modeling approaches, management strategies, performance optimization, and implementation procedures within this field of study.

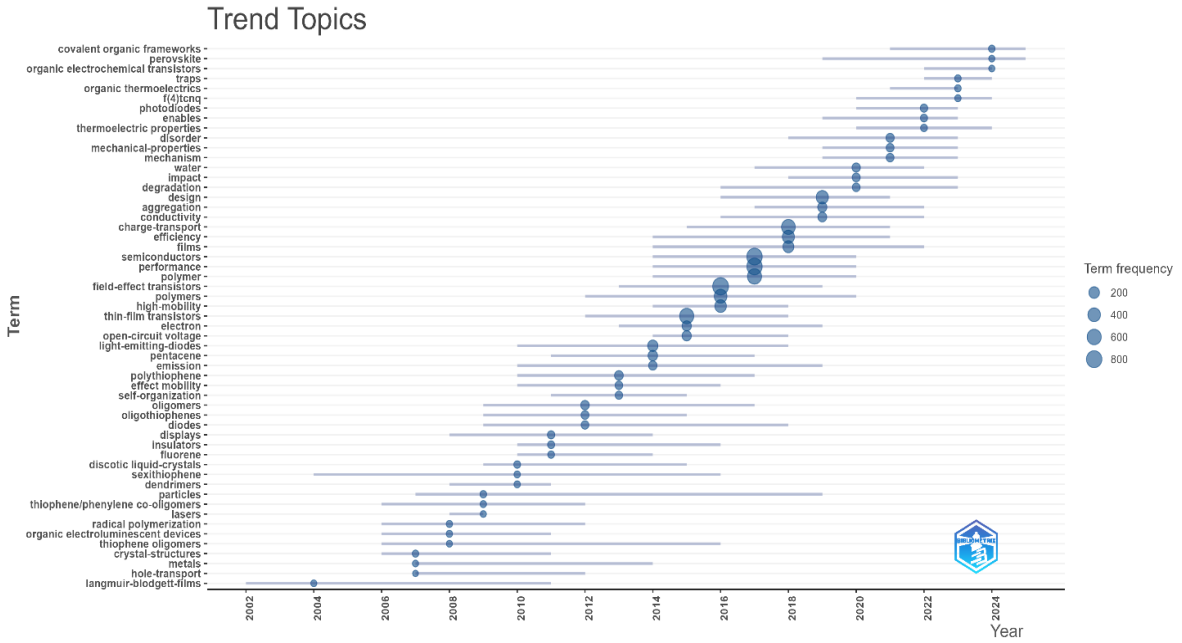

Figure 11. Trend topic.

Figure 12 presents a hierarchical depiction of study themes according to their density and centrality, illustrating the thematic mapping technique. By grouping themes into four quadrants, this mapping provides information about the themes' importance and stage of development within the academic discourse. The Motor Themes, which have a high centrality and density, are represented by the upper-right quadrant. These themes have been developed extensively, are well-established, and show strong connections both within and outside. Notably, performance, polymer, and transport emerge as the dominant research themes in this category, signifying their fundamental role in the field. The bottom-right quadrant encompasses the Basic Themes, which, despite having high centrality, are still evolving in terms of conceptual depth. Key themes in this quadrant include field-effect transistors, semiconductors, and thin-film transistors, reflecting foundational research topics that underpin broader discussions within polymer-based organic semiconductor materials methodologies. The bottom-left quadrant consists of Emerging or Declining Themes, characterized by low density and centrality. These themes are either nascent areas of study or concepts that are losing scholarly attention. Within the context of polymer-based organic semiconductor materials research, conjugated, design, and copolymers are among the themes identified in this quadrant, indicating their relatively peripheral role in the literature. The upper-left quadrant includes Niche Themes, which have high density but low centrality. Within the context of the research, nanoparticles, nanocrystals, and quantum dots are among the themes identified in this quadrant. These topics are highly specialized and may not yet be widely integrated into the broader research framework. Additionally, Figure 13 presents an analysis of author affiliations, providing insights into the institutional distribution of research contributions in this field.

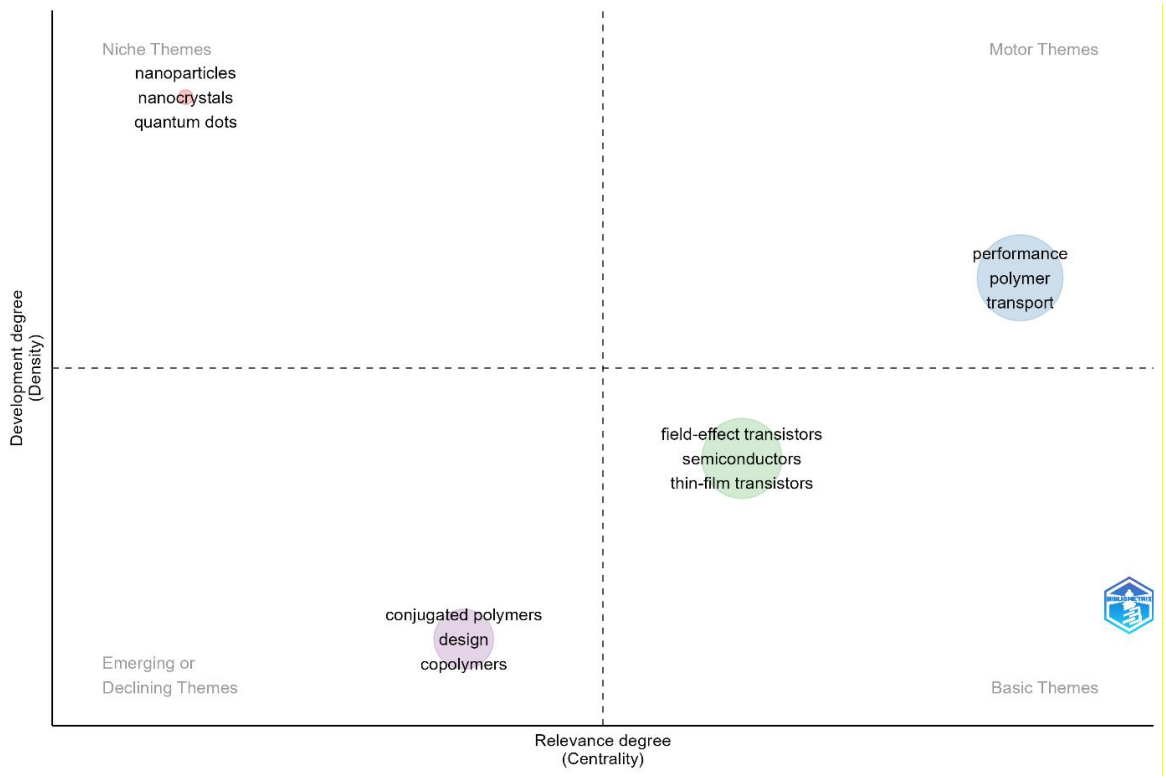

Figure 12. Thematic mapping

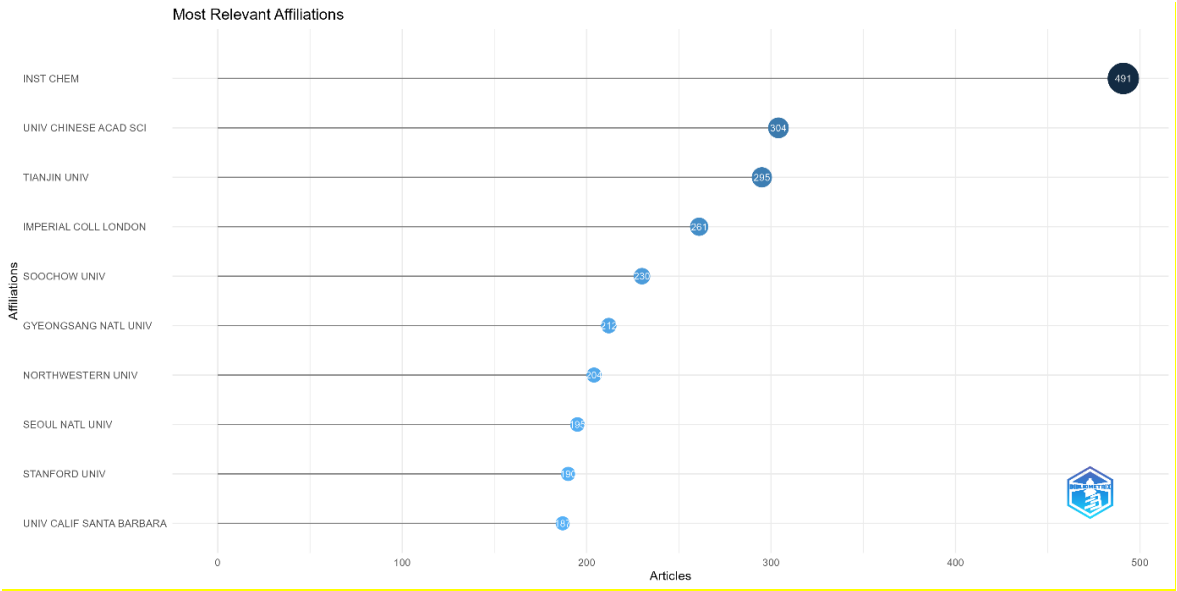

Figure 13. Most relevant affiliations

The primary institutional affiliations of research articles related to this topic are presented in Figure 13. The leading institutions contributing to this field include Institute of Chemistry (N = 491), University of Chinese Academy of Sciences (N = 304), Tianjin University (N = 295), Imperial College London (N = 261), and Soochow University (N = 230). These institutions have made significant contributions to advancing research in this domain. Furthermore, Figure 14 provides a geographical analysis, illustrating the distribution of authors based on their respective countries.

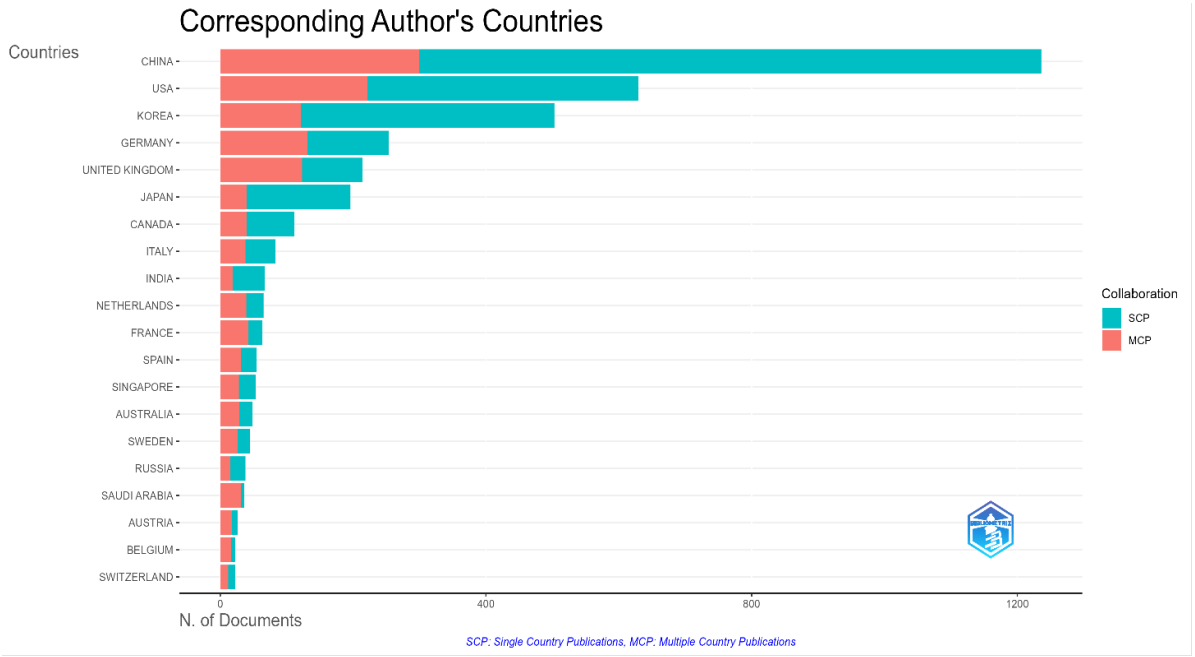

Figure 14. Corresponding authors' country

As illustrated in Figure 14, the majority of corresponding authors were affiliated with institutions in the China (N=1236), indicating the country's leading role in research within this domain. The top five contributing nations also included United States (N=629), Korea (N=503), Germany (N=254), and the United Kingdom (N=214). A thorough examination of the quantity, percentage, and frequency of topic-related publications by nation is also given in Table 4. In order to illustrate the scope of international research collaboration in this area, this table also distinguishes between Single-Country Publications (SCP), which are studies carried out within a single country, and numerous-Country Publications (MCP), which are collaborative studies combining numerous foreign affiliations.

Table 4. Most relevant countries-corresponding author's country

Country	**Articles**	**Articles %**	**SCP**	**MCP**	**MCP %**
China	1236	31.4	937	299	24.2
USA	629	16	408	221	35.1
Korea	503	12.8	382	121	24.1
Germany	254	6.5	123	131	51.6
United Kingdom	214	5.4	91	123	57.5
Japan	196	5	156	40	20.4
Canada	111	2.8	71	40	36
Italy	83	2.1	45	38	45.8
India	67	1.7	48	19	28.4
Netherlands	65	1.7	26	39	60

A comprehensive analysis of the corresponding authors' institutional affiliations reveals that the China emerged as the leading contributor, accounting for 1236 research articles (f =31.4%). As detailed in Table 4, while 299 publications resulted from international collaborations, the majority (N=937) were single-author studies conducted exclusively within the China. This finding underscores the country's dominant role in advancing research within this domain. Notably, the China outperformed United States, which ranked second in terms of publication output, further solidifying its position as a key driver of scholarly contributions in this field.

The global distribution of research output is further illustrated in Figure 15 and Table 5, highlighting the China (N=6192), United States (N=3113), and South Korea (N=2797) as the three most prolific nations in this research area. These countries have demonstrated significant scientific engagement, contributing extensively to the development and dissemination of knowledge. Additionally, the Germany (N=1303) and United Kingdom

(N=1097) emerged as other major research hubs, reinforcing the international significance and widespread academic interest in this topic. The significant contributions made by these countries show that improving research techniques, encouraging multidisciplinary cooperation, and tackling new issues in the field are becoming increasingly important on a worldwide scale.

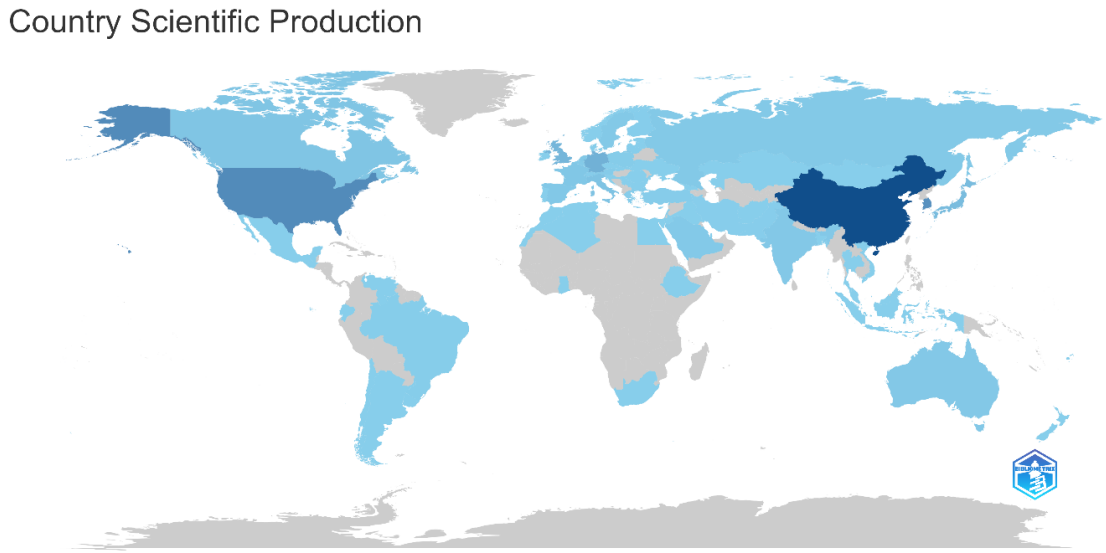

Figure 15. Country scientific production

Table 5. Country scientific production on topics

Country	**Frequency**
China	6192
USA	3113
South Korea	2797
Germany	1303
United Kingdom	1097
Japan	810
Italy	478
Canada	413
France	334
Netherlands	292

Figure 16 presents the co-occurrence network, illustrating the evolution of thematic influences over time within the research domain. The size of each network node corresponds to the frequency and prominence of a given topic, with “field-effect transistors” emerging as the central focal point, around which the primary research discussions are concentrated. The first thematic cluster prominently features key concepts such as “thin-film transistors,” “mobility,” and “transport”, signifying their integral role in the academic discourse. The second cluster encompasses topics such as “semiconductors,” “performance,” “polymer,” “charge-transport,” "conjugated polymers" and “polymers”. The co-occurrence network visualization underscores the dynamic interconnectivity of research themes and their evolving significance, reflecting both core and emerging areas of scholarly inquiry within the field.

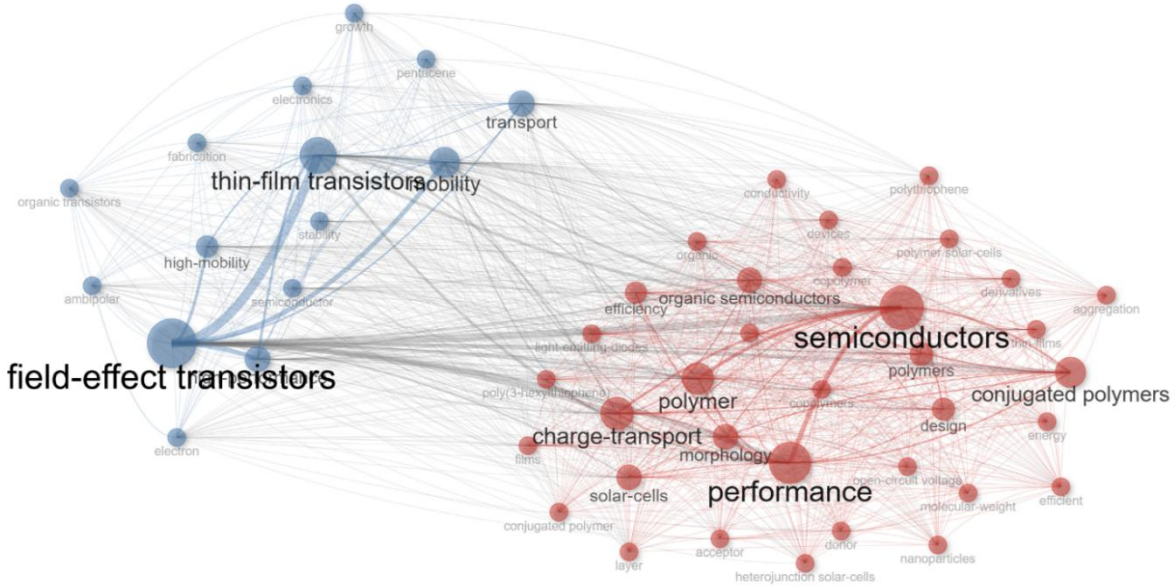

Figure 16. Co-occurrence network

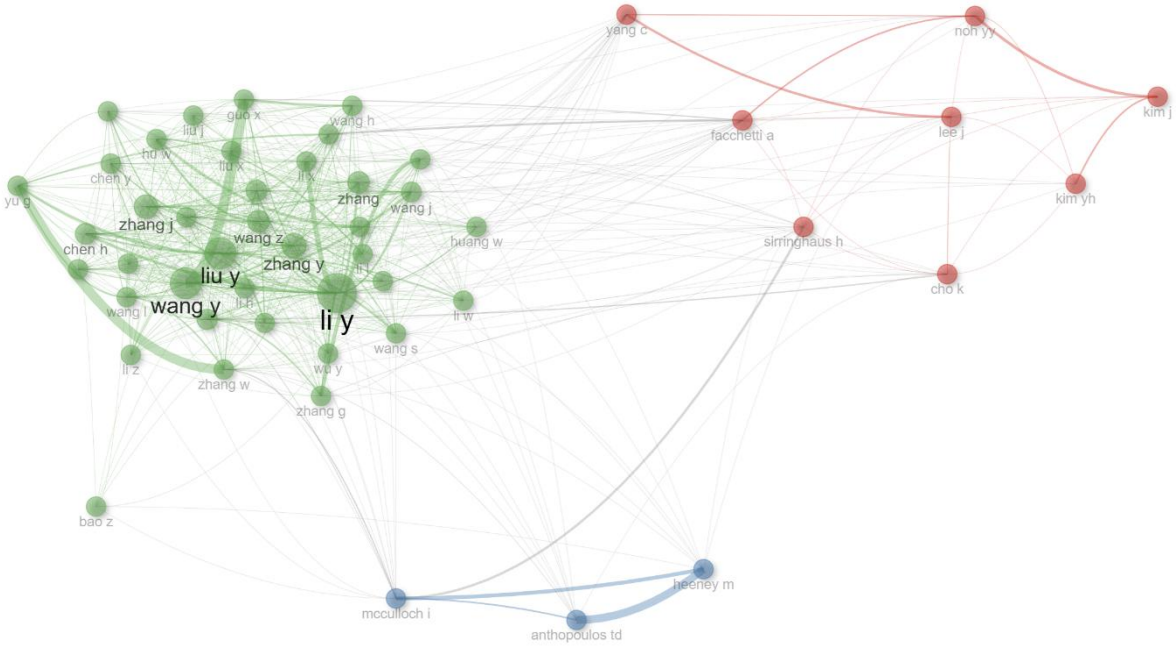

Figure 17. Collaboration network of authors

The author collaboration network within the polymer-based organic semiconductor materials research domain is structured into three distinct clusters, as illustrated in Figure 17. Strong collaborative ties between several research teams are evident from this segmentation, which promotes co-authorship patterns and intellectual exchange in the area. The relationships among the red, blue, and green clusters imply that researchers in these groups frequently collaborate across disciplines, which helps to spread concepts and approaches. In addition, active participants such as Kim J, Noh Y, Lee J, Cho K and Facchetti A contributed to the domain. The extension of the partnership structure within the domain has also been greatly aided by the contributions of other active participants Mcculloch I, Anthopoulos TD, and Heeney M. The investigation of collaboration networks provides important information about author influence, current research trends, and the relationships between important contributors. Identifying new research partnerships and possible avenues for future multidisciplinary collaboration in polymer-based organic semiconductor materials methods is another benefit of this network mapping.
Some bibliometric studies on the subject were accessed. In the study of Meza et al. (2023), the following results were obtained.

In the investigated field, the number of original papers produced increased rapidly. The majority of cited articles in these domains addressed the use of big data and artificial intelligence in manufacturing. To be included in the top 10, the most productive institutions had to submit at least 22 documents. In terms of the fourth industrial revolution as it relates to material science, China and the US were the most implicated nations; their success is attributed to the implementation of particular public policies [26]. Zhong RY. (2017), Tao F. (2018), and Frank AG. (2019) wrote the three most-cited papers in the same study [26]. Zhong's work, which is about intelligent manufacturing, is the review with the most citations that is exclusively available in Scopus [27]. Tao's work addresses the application of big data in product life cycle management and suggests a novel approach to its design, production, and maintenance that is based on digital twins [28]. The findings of the authors' study differed from the findings of this study.

IV. Conclusion

By reviewing papers published up to 2025, this study was conducted to describe the usability of polymer-based organic semiconductor materials in multidisciplinary research. The results show that polymer-based organic semiconductor materials are increasingly indispensable applications in multidisciplinary. The most cited papers, most cited nations, most pertinent affiliations, prolific authors, scientific output of articles, and keyword analysis were all made possible by performance analysis. Moreover, the relationship between places, concepts, documents, authors, and institutions was demonstrated through the application of scientific mapping analysis. 98.83% of the papers published in polymer-based organic semiconductor materials are articles, and proceedings paper constitute 1.17% of the total papers published. The survey identified 13063 authors in polymer-based organic semiconductor materials studies, of whom 99.85% wrote multiple-authored papers and 0.15% wrote single-authored ones. Between 2007-2018, the amount of scientific research produced each year continued to increase. From 2019 to 2021, the number of publications started to decline. In the period 2022-2024, the number of publications fluctuated. According to the institutions' evaluations, Institute of Chemistry was the most productive in terms of publishing frequency, followed by University of Chinese Academy of Sciences, and Tianjin University. The most productive nations China, the United States, and South Korea have a notably high concentration of publications written on this subject. The most prolific and significant author of research on polymer-based organic semiconductor materials was Li Y, who was followed by Liu Y and Wang Y. Sustainable studies for the identification and development of "field-effect transistors", "semiconductors", "performance", "thin-film transistors", "polymer", "charge-transport", "conjugated polymers", "mobility", "transport", and "polymers" can be prioritized in the field of polymer-based organic semiconductor materials.

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